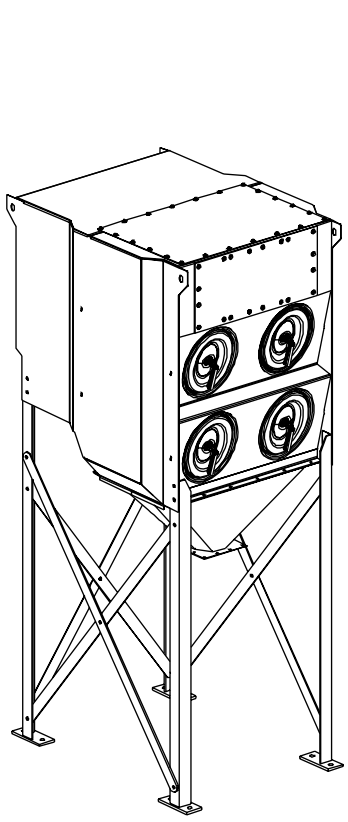
Donaldson®
Torit®

Installation and Operation Manual

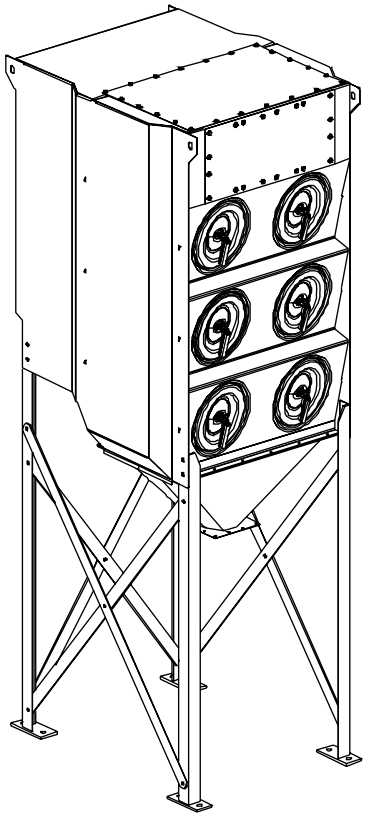
Installation, Operation, and Service Information

Downflo® Oval

DFO 2-4 and DFO 3-6



Model DFO 2-4



Model DFO 3-6

Patent Numbers:

6,387,162 6,090,173
6,488,746 5,562,746
6,364,921 6,368,388
Other Patents Pending

Throughout this manual statements indicating precautions necessary *to avoid equipment failure* are referenced in a **Note.** Statements indicating potential hazards that could result in *personal injury or property damage* are referenced in a **Caution!** box.

This manual is property of the owner. Leave with the unit when setup and start-up are complete. Donaldson Company reserves the right to change design and specifications without prior notice.

IOM 9603801
Revision 8

CAUTION!

Application of Dust Control Equipment

- Combustible materials such as buffing lint, paper, wood, aluminum or steel dust, weld fume, or flammable solvents represent fire or explosion hazards. Use special care when selecting and operating all dust or fume collection equipment when combustible materials are present to protect workers and property from damage due to fire and/or explosion. Consult and comply with National and Local Codes relating to fire or explosion and all other appropriate codes when determining the location and operation of dust or fume collection equipment.
- When combustible materials are present, consult with an installer of fire extinguishing systems familiar with these types of fire hazards and local fire codes for recommendations and installation of fire extinguishing and explosion protection systems. Donaldson Torit dust collection equipment is not equipped with fire extinguishing or explosion protection systems.
- DO NOT allow sparks, cigarettes or other burning objects to enter the hood or duct of any dust or fume control equipment as these may initiate a fire or explosion.
- For optimum collector performance, use only Donaldson Torit replacement parts.

Warning – Improper operation of a dust control system may contribute to conditions in the work area or facility that could result in severe personal injury and product or property damage. Check that all collection equipment is properly selected and sized for the intended use.

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This manual contains specific precautionary statements relative to worker safety. Read thoroughly and comply as directed. Discuss the use and application of this equipment with a Donaldson Torit representative. Instruct all personnel on safe use and maintenance procedures.

Data Sheet

Model Number _____ **Serial Number** _____

Ship Date _____ **Installation Date** _____

Customer Name _____

Address _____

_____

Filter Type _____

Accessories _____

Other _____

Description

The Downflo Oval, Models DFO 2-4 and DFO 3-6 are continuous-duty dust collectors with oval, cartridge-style filters. The downward airflow design delivers high filtration efficiency while using less energy. Continuous-duty means no downtime. The filters are pulse-cleaned in sequence, one set at a time, without turning the unit off. Model DFO 2-4 is two filters wide by two filters high by one filter deep and Model DFO 3-6 is two filters wide by three filters high by one filter deep.

Designed to increase the versatility of the unit, standard options include top, front, and abrasion-resistant inlets, HEPA and ASHRAE afterfilter packs, Checker board control panel, and various dust removal options.

Purpose and Intended Use

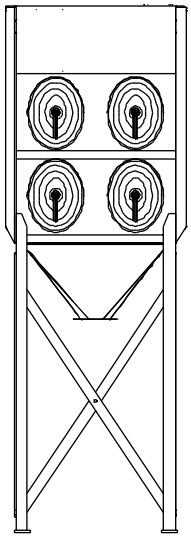
Downflo Oval collectors are widely used on nuisance dust where the load to the collector is less than 2 grains per cubic foot. Some typical applications include abrasive blasting, grinding, pharmaceuticals, powder paint applications, sand handling, and welding. Each application is different and selecting the correct filter cartridge for the application and type of dust collected is important.

- For all ambient, extremely fine, and non-fibrous dust, use Ultra Web® filter cartridges which offer high efficiency and performance on fine particulate.
- For fibrous dust, use a cartridge with an open-pleat design, such as Fibra-Web®.
- Operations involving high temperature and high humidity may require special attention. Temperature, moisture content, and chemistry issues may require custom collector design. Appropriate cartridge options are available from Donaldson Torit.
- Hygroscopic dust such as fertilizer, salt, and sugar should be handled under a controlled, low humidity environment. Contact Donaldson Torit for filter cartridge selection.
- Flammable or explosive dust may require custom collector design options and special cartridges. Contact Donaldson Torit for design assistance.
- Applications with high hydrocarbon or high oil content may require special treatment or filter media.

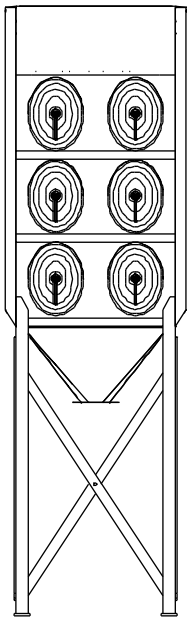
CAUTION!

- Misuse or modification of this equipment may result in personal injury.
- Do not misuse or modify.

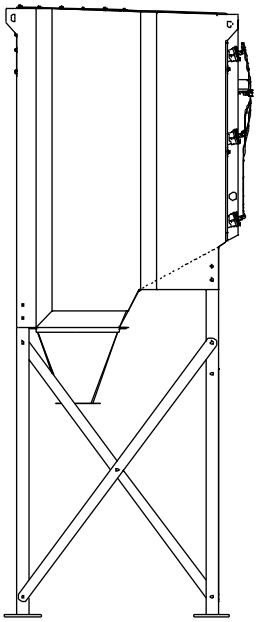
Rating and Specification Information



DFO 2-4



DFO 3-6



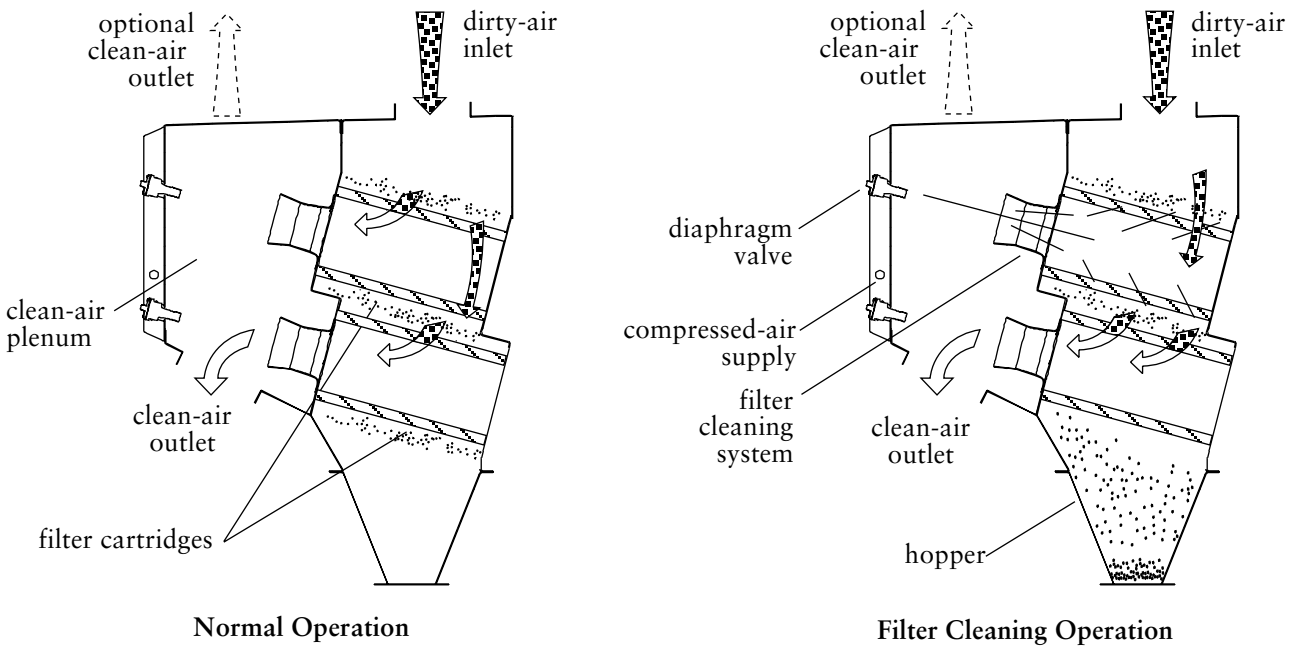
Side View
DFO 2-4 and DFO 3-6

All Units (per IBC 2003 Specifications):
Wind ..... 90 MPH Exposure C
Seismic Spectral Acceleration, S_s ..... 1.5 g
Seismic Spectral Acceleration, S_1 ..... 0.6 g
Importance Factor, 1 ..... 1.0
Ground Snow Load ..... Pg = 40 PSF
Compressed air, maximum psig 60
Housing rating, inches water gauge ..... +-20
Power, valves and controls ..... 120-Volt 50/60 Hz

Operation

During normal operation, dust-laden air enters the unit through the dirty-air inlet. Airflow is directed downward through the collector and heavier particulate falls directly into the hopper. The cartridges remove fine particulate and clean, filtered air passes through the cartridge to the clean-air plenum and discharges through the clean-air outlet.

Filter cleaning is completed using pulse-jet technology. A solenoid and air diaphragm valve aligned to each filter provides the pulse cleaning. The cleaning sequence starts at the top filter and continues down through each filter. Remove, inspect, or change the filter cartridges from outside the unit by removing the filter access cover and sliding the filter out.



Unit Operation

CAUTION!

- Combustible materials such as buffing lint, paper, wood, aluminum or steel dust, weld fume, and flammable solvents represent fire or explosion hazards.
- Use special care when selecting and operating all collection equipment when combustible materials are present to protect workers and property from damage due to fire and/or explosion.
- Consult and comply with all National and Local Codes relating to fire or explosion, and all other appropriate codes when determining the location and operation of dust collection equipment.
- Donaldson Torit equipment is *not* equipped with fire extinguishing or explosion protection systems.

Inspection on Arrival

1. Inspect unit on delivery.
2. Report any damage to the delivery carrier.
3. Request a written inspection report from the Claims Inspector to substantiate claim.
4. File claims with the delivery carrier.
5. Compare unit received with description of product ordered.
6. Report incomplete shipments to the delivery carrier and your Donaldson Torit representative.
7. Remove crates and shipping straps. Remove loose components and accessory packages before lifting unit from truck.

Installation Codes and Procedures

CAUTION!

OSHA may have requirements regarding recirculating filtered air in your facility. Consult with the appropriate local authorities to ensure compliance with all codes regarding recirculating filtered air.

1. Safe and efficient operation of the unit depends on proper installation.
2. Authorities with jurisdiction should be consulted before installing to verify local codes and installation procedures. In the absence of such codes, install unit according to the National Electric Code, NFPA No. 70-latest edition.
3. A qualified installation and service agent must complete installation and service of this equipment.
4. All shipping materials, including shipping covers, must be removed from the unit prior to, or during unit installation.

   Note: Failure to remove shipping materials from the unit will compromise unit performance.

Installation

Site Selection, Grade-Mounted Units

1. The unit can be located on a reinforced concrete foundation or rooftop.
2. Wind, seismic zone, and other live-load conditions must be considered when selecting the location for rooftop-mounted units. Reference the Rating and Specification Information.
3. Provide clearance from heat sources and interference with utilities when selecting the location for suspended units. Reference the Rating and Specification Information.
4. Portable units require no special installation accommodations.

Unit Location

1. When hazardous conditions or materials are present, consult with local authorities for the proper location of the collector.
2. Foundation or roof support must be capable of supporting the entire weight of the unit, plus the weight of the collected material, piping, and ductwork.
3. Prepare the foundation in the selected location. Install anchor bolts to extend a minimum of 1 3/4-inches above foundation.
4. Locate the collector to ensure the shortest and straightest inlet- and outlet-duct length, easy access to electrical and compressed-air connections, and routine maintenance.

CAUTION!

Donaldson Torit equipment is not designed to support site-installed ducts, interconnecting piping, or electrical services. All ducts, piping, or electrical services supplied by others must be adequately supported to prevent severe personal injury and/or property damage.

Electrical Wiring

CAUTION!

- Electrical installation must be performed by a qualified electrician and comply with all applicable national and local codes.
- Lock out electrical power sources before performing service or maintenance work.
- Do not install in classified hazardous atmospheres without an enclosure rated for the application.

1. All electrical wiring and connections, including electrical grounding, should be made in accordance with the National Electric Code, NFPA No. 70-latest edition.
2. Check local ordinances for additional requirements that apply.
3. The appropriate wiring schematic and electrical rating must be used. See unit's rating plate for required voltage.
4. If the unit is not furnished with a factory-mounted disconnect, an electric disconnect switch having adequate amp capacity shall be installed in accordance with Part J, Article 430 of the National Electrical Code, NFPA No. 70-latest edition. Check unit's rating plate for voltage and amperage ratings.
5. Refer to the wiring diagram for the number of wires required for main power wiring and remote wiring.

Rigging Instructions

Suggested Tools & Equipment

Clevis Pins and Clamps	Lifting Slings
Crane or Forklift	Pipe Sealant
Drift Pins	Pipe Wrenches
Drill and Drill Bits	Screwdrivers
End Wrenches	Socket Wrenches
Large Crescent Wrench	Spreader Bars

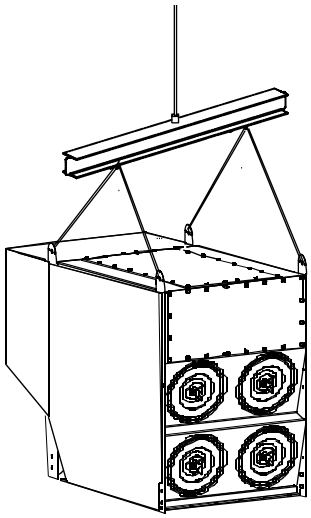
Hoisting Information

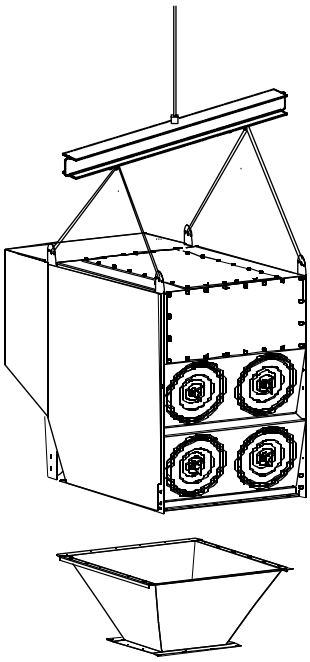
1. Use all lifting points provided.
2. Use clevis connectors, *not hooks*, on lifting slings.
3. Use spreader bars to prevent damage to unit's casing.
4. Check the Specification Control drawing for weight and dimensions of the unit, subassemblies, and components to ensure adequate crane capacity.
5. Allow only qualified crane operators to lift the equipment.
6. Refer to applicable OSHA regulations and local codes when using cranes, forklifts, and other lifting equipment.
7. Lift unit and accessories separately, and assemble after unit is in place.
8. Use drift pins to align holes in section flanges during assembly.

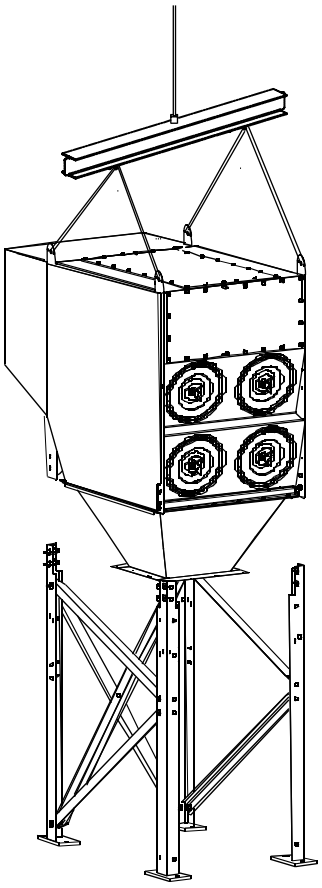
CAUTION!

- Failure to lift the collector correctly can result in severe personal injury or property damage.
- Use appropriate lifting equipment and adopt all safety precautions needed for moving and handling the equipment.
- A crane or forklift is recommended for unloading, assembly, and installation of the collector.
- Location must be clear of all obstructions, such as utility lines or roof overhang.

Typical Installation

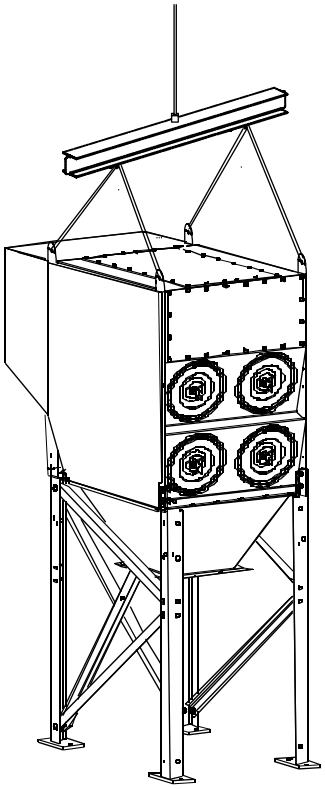




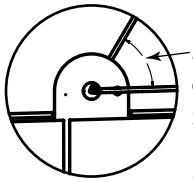


1. Lift cabinet.
2. Apply sealant to hopper flange.
3. Fasten hopper to cabinet.

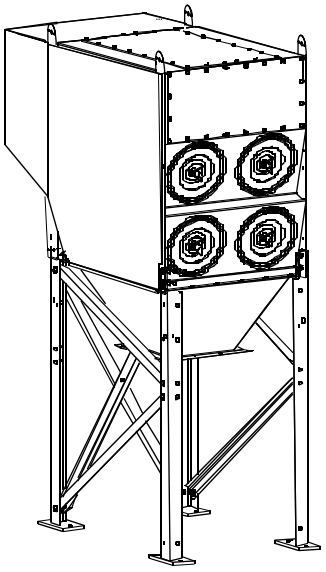
4. Assemble legs and cross braces.
5. Lift unit and hopper into position over legs and lower slowly.
6. Fasten legs to unit securely.



7. Lift assembled unit to location.
8. Support and level unit.
9. Tighten all fasteners.
10. Remove crane.



Do Not lift with
this orientation



Standard Equipment

Standard equipment consists of a collector cabinet, hopper, and legs. Basic assembly starts by attaching the hopper to the cabinet, then attaching the legs. A detailed instruction drawing, shipped with each collector, provides specific assembly and lifting instructions.

CAUTION!

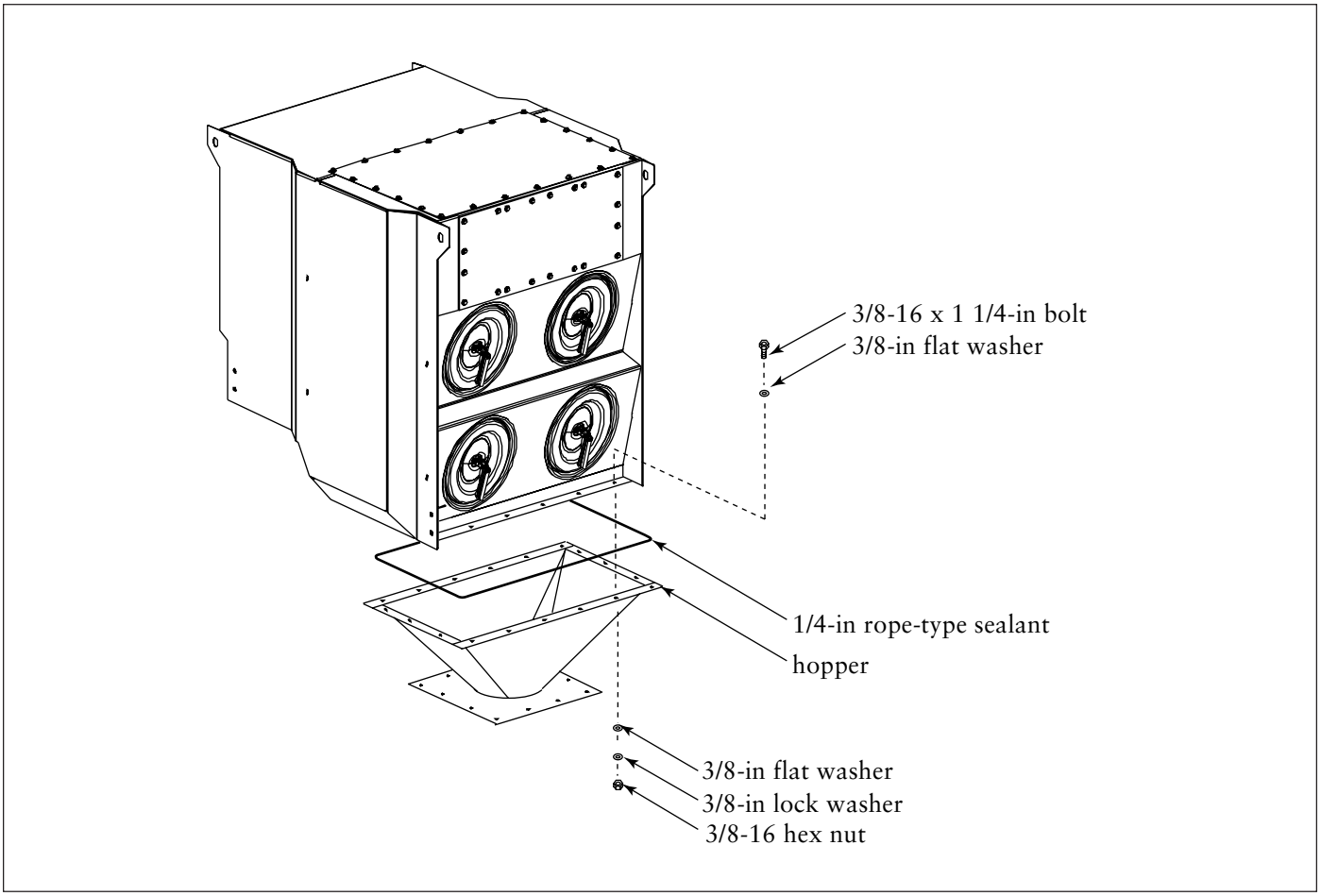
- Failure to lift the collector correctly can result in severe personal injury or property damage.
- Use appropriate lifting equipment and adopt all safety precautions needed for moving and handling the equipment.

Hopper Assembly

Assemble the standard or the optional steep-sided hopper following these instructions.

1. Stand the hopper on the discharge end.
2. Apply 1/4-in diameter rope-type sealant around the top flange toward the inside edge of the bolt pattern.
3. Lift the collector and position over the hopper and lower *slowly*.
4. Use drift pins to align holes.
5. Secure collector to hopper using 3/8-16 x 1 1/4-in bolts, flat washers, and nuts. Tighten all hardware securely. See Hopper Installation below.

Note: Support or block unit to prevent personal injury or property damage.



Hopper Installation

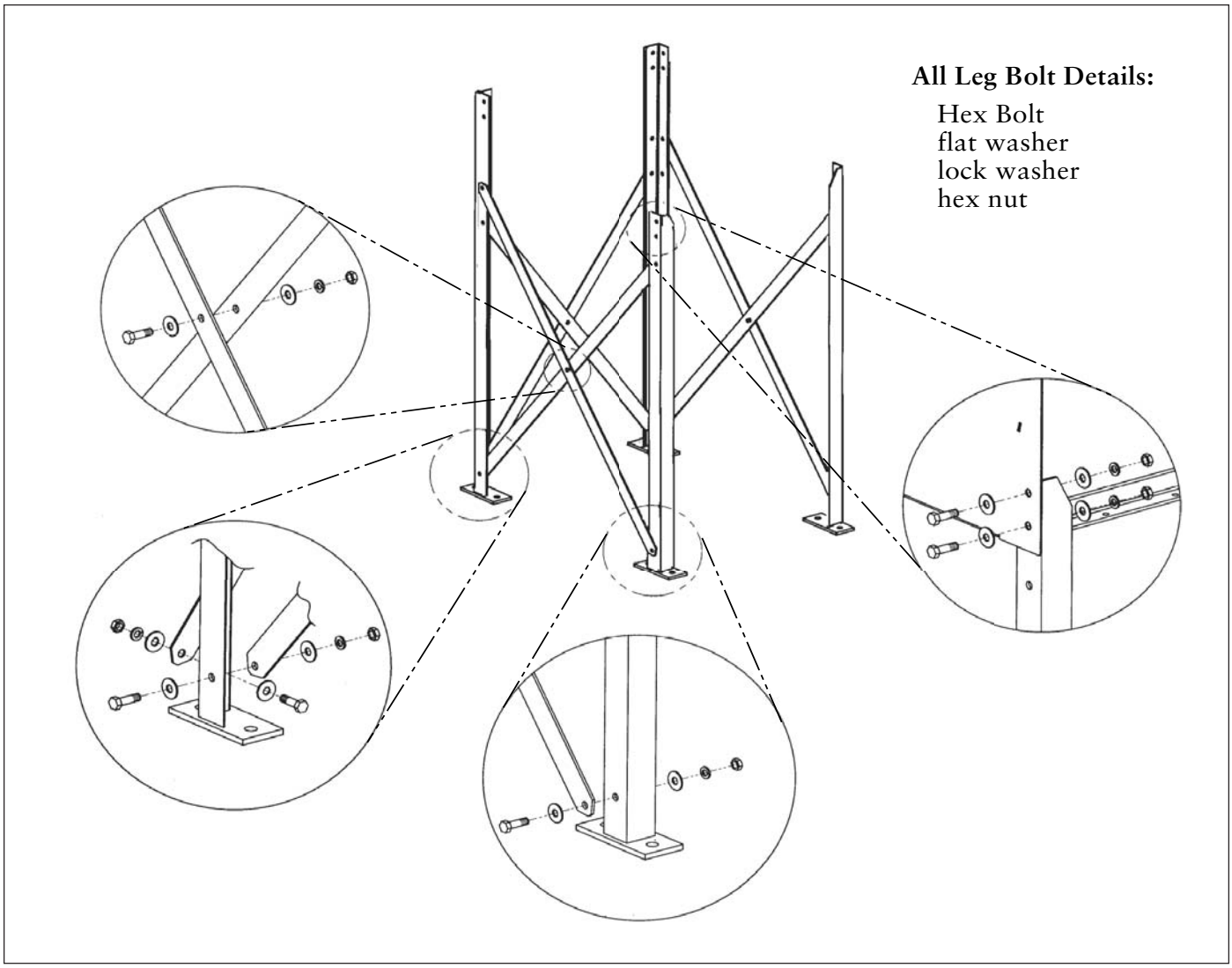
Leg Assembly

Leg sets are designed for standard height collectors and are rated as shown in the Rating and Specification Information. Reference the drawing shown below and the leg assembly drawing shipped with the leg set for proper location and assembly.

1. Position and assemble legs and cross braces as shown in Leg and Cross Brace Assembly.
2. Lift the cabinet and hopper assembly into position over the legs and lower slowly.
3. Use drift pins to align the holes in the collector with the holes in the legs. Attach each leg as shown using the hardware supplied. ***Do not tighten hardware at this time.***
4. Recheck the position of the leg sets and cross braces.
5. Using a crane, lift the assembled unit onto the anchor bolts. Fasten each leg pad to the anchor bolts using flat washers, lock washers, and hex nuts provided by others. ***Do not tighten hardware at this time.***
6. Level unit. Tighten all hardware on legs, cross braces, and foundation anchors.

CAUTION

Tighten all leg and cross brace hardware before removing crane.



Leg and Cross Brace Assembly

Compressed Air Installation

CAUTION!

- 60-psig maximum operating pressure.
- Air regulator required.

1. Remove the 1-in pipe cap from one of the unit's two air manifolds and connect the compressed-air supply line. Use thread-sealing tape or pipe sealant on all compressed-air connections.
2. Install a customer-supplied shut-off valve, bleed-type regulator with gauge, filter, and automatic condensate valve in the compressed-air supply line.

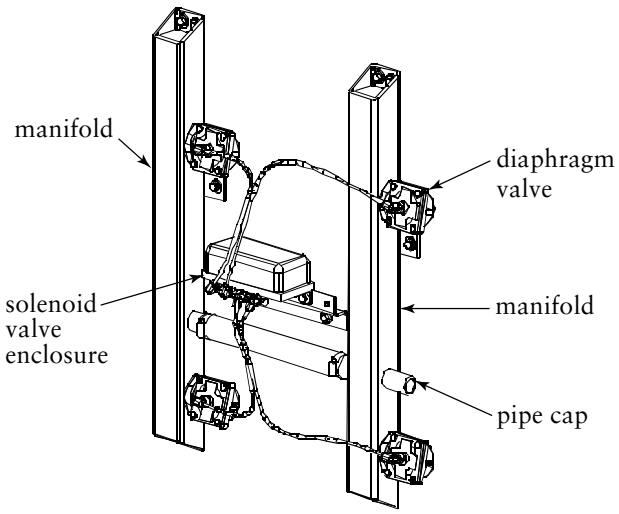
   Note: All compressed-air components must be sized to meet the maximum system requirements of 0.86 cu ft/pulse at 60-psi supply pressure.

   Do not increase supply pressure above 60-psi. Component damage can result.

CAUTION!

- The compressed-air supply must be oil and moisture free. Contamination in the compressed air used to clean filters will result in poor cleaning, cleaning valve failure or poor collector performance.
- Purge compressed-air lines to remove debris before connecting to the unit's compressed-air manifold.
- Turn compressed-air supply OFF and bleed lines before performing service or maintenance work.

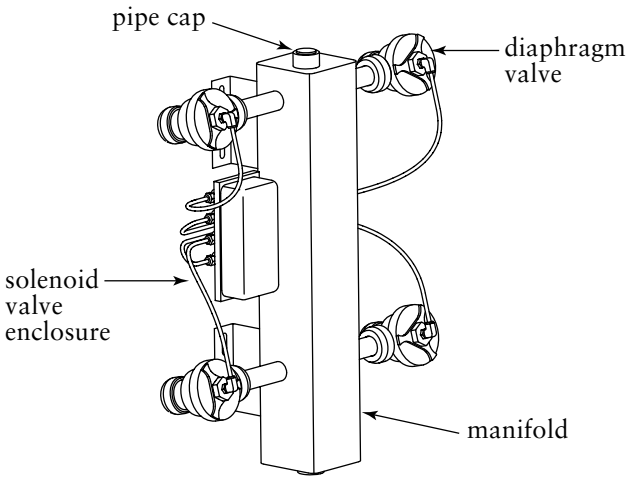
Units Built Before November 2006



Note: 60-psig maximum supply pressure

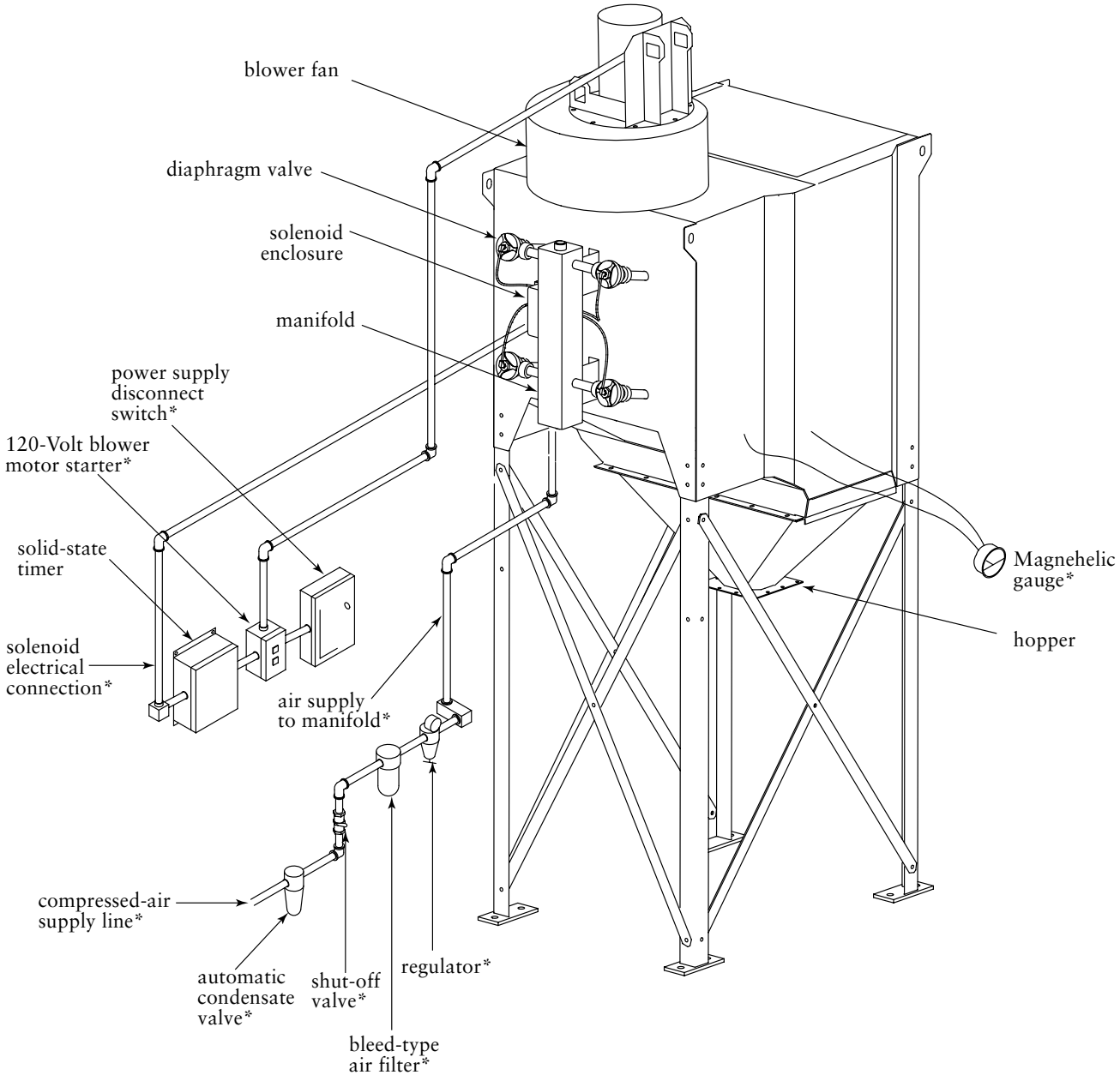
Manifold

Units Built After November 2006



Note: 60-psig maximum supply pressure

Manifold



Notes: 1. * Not included with standard unit.
2. Sprinkler taps not shown.

Compressed-Air and Component Installation

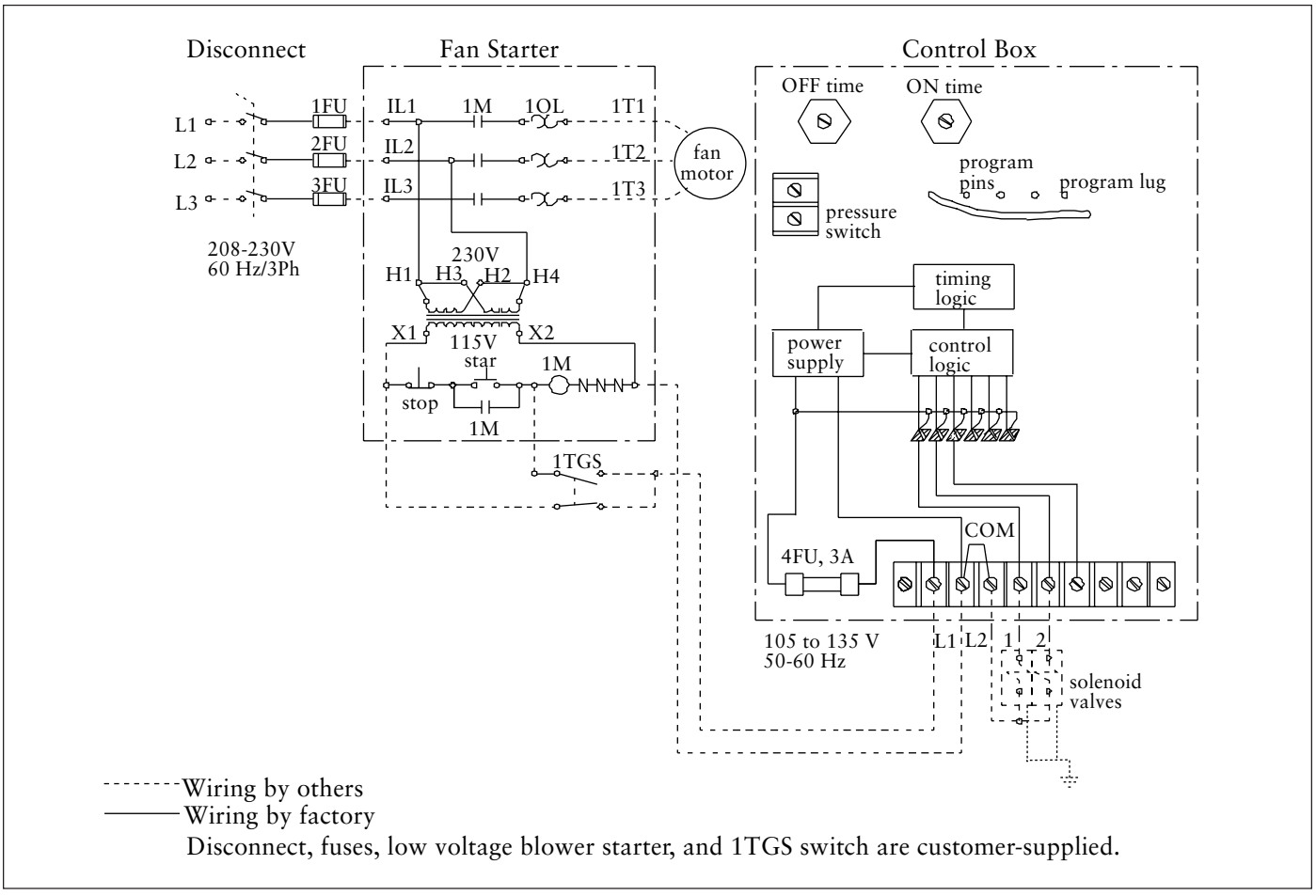
Solid-State Timer Installation

The solid-state timer is an electronic timer used to control the filter cleaning system.

CAUTION!
The solid-state timer requires a 105 to 135-Volt, customer-supplied power supply.

Note: Do not mount the solid-state timer on the unit. Mechanical vibration can damage the control.

1. Using the wiring diagram supplied, wire the blower motor, blower-motor starter, solid-state timer, and solenoid valves. Use appropriate wire gauge for rated amp load as specified by local codes.
2. Plug the program lug into the pin that corresponds with the number of solenoid valves controlled.
3. With power supply ON, check the operation of the solenoid valves. The valves should open and close sequentially at factory set 10-second intervals.
4. If a Photohelic gauge or similar device is used to control the solid-state timer and the jumper on the pressure switch portion of the timer is removed, the solenoid valves pulse only when the differential pressure reaches the high-pressure setpoint. The valves continue to pulse until the low-pressure setpoint is reached.



Solid-State Timer Wiring Diagram

Solenoid Connection

The unit is equipped with 115-Volt solenoid valves that control the pulse-cleaning valves, which clean the filters.

One of three types of solenoid enclosures, the weatherproof NEMA 4 with 1/8-in solenoid valves; the gas-explosion proof NEMA 7 with 1/8-in solenoid valves; or the dust-explosion proof NEMA 9 with 1/8-in solenoid valves, is mounted near or on the unit's compressed-air manifold.

Wire the solenoids to the solid-state timer following the wiring diagram supplied with the unit. Filter life and cleaning operation will be affected if not wired correctly.

Timer and Solenoid Specifications

Power to the solid-state timer is supplied to Terminals L1 and L2, which operate in parallel with the blower starter's low-voltage coil. On blower start-up, power is supplied to the timer and the preset OFF time is initiated. At the end of the OFF time, the timer energizes the corresponding solenoid valve to provide the ON time cleaning pulse for one diaphragm valve and then steps to the next until all filters have been cleaned.

To pulse when the blower is OFF, install a toggle switch as shown on the Solid-State Timer Wiring Diagram. When the toggle switch is ON, the timer receives power and energizes the solenoid valves' pulse-cleaning operation even though the blower is turned OFF.

Input
105-135V/50-60Hz/1Ph

Output Solenoids
The load is carried and turned ON and OFF by the 200 watt maximum-load-per-output solid-state switch.

Pulse ON Time
Factory set at 100-milliseconds, or 1/10-second.

Note: *Do not* adjust pulse ON time unless the proper test equipment is available. Too much or too little ON time can cause shortened filter life.

Solenoid Valves
115-Volt at 19.7 watts each

Compressed-Air
Set compressed-air supply at 60-psig. The timer is factory set to clean one filter or set of filters every 10-seconds.

CAUTION!

Do not set compressed-air pressure above 60-psig. Component damage will occur.

Preliminary Start-Up Check

1. Check all electrical connections for tightness and contact.
2. Check for and remove all loose items in or near the inlet and outlet of the unit.
3. Check that all remote controls are wired into the control system and all service switches are in the OFF position.
4. Check that all optional accessories are installed properly and secured.
5. Check that hopper discharge is open and the storage container is sealed, if equipped.
6. Turn power ON at source.
7. Turn the compressed-air supply ON. Adjust pressure regulator for 60-psi.
8. Turn the fan motor ON then OFF to check for proper rotation by referencing the rotation arrow located on the motor's mounting plate.

   To reverse rotation, single-phase power supply:

   Follow manufacturer's instructions on the motor's nameplate.

   To reverse rotation, three-phase power supply:

   Turn electrical power OFF at source and switch any two leads on the output-side of the fan-motor starter.
9. Adjust the blower/fan for proper airflow by adjusting the volume control damper on the blower/fan discharge, if equipped.

   Note: Excess airflow can shorten filter life, cause electrical system failure, and blower motor failure.

Service Information

Operational Checklist

1. Monitor overall performance of the collector.
2. Monitor exhaust.
3. Monitor pressure drop across filters.
4. Monitor dust disposal.

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Filter Installation and Replacement

CAUTION!

- Use proper safety and protective equipment when removing contaminants and filters.
- Dirty filters may be heavier than they appear.
- Use care when removing filters to avoid personal injury.
- Do not drop filters.

Filter Removal

1. Turn power to unit OFF.
2. Start at the top access port.
3. Remove access cover. For units without Bag-In/Bag-Out: remove access cover by lifting latch handle and lifting cover to remove from yoke. For units with Bag-In/Bag-Out: lift up access cover handle and while pushing in on cover, slide access cover to the side 1-inch to remove access cover.

   If the access cover clamp fails to operate smoothly, apply WD-40® to the riveted pivot points and to the clamp rod where it passes through the outside of the cover. Wipe off overspray.
4. Break the seal between the filter cartridge and the sealing surface.
5. Slide the filter out the access port along the suspension yoke and dispose of properly.
6. Clean the sealing surface with damp cloth.

   Note: Clean dust from gasket sealing area to ensure a positive filter gasket seal.
7. Check for an accumulation of dust in the storage area and empty as necessary.

Filter Replacement

Note: Place filter part number label (supplied with each replacement filter) over the filter part number listed on the unit's rating plate.

1. Slide the new filter cartridges onto each suspension yoke.

   Note: Insert the filter gasket end first.
2. Wipe cover gaskets clean and replace covers by attaching cover to yoke hook and firmly latching cover handle.

   Note: Check that access covers are seated and seal properly. Gaskets must be compressed to ensure an airtight seal.
3. Turn electrical power and compressed air supply ON before starting unit.

Dust Disposal

1. Turn unit OFF and empty dust container as necessary to minimize dust in the hopper.
2. If the optional 55-gallon drum attachment is used, empty when drum is 2/3 full.
3. If optional slide gate is used, close gate before servicing drum.
4. Reinstall drum and open gate (if applicable).

Compressed Air Components

1. Periodically check the compressed air components and replace compressed-air filter.
2. Drain moisture following the manufacturer's instructions.
3. With the compressed-air supply ON, check the cleaning valves, solenoid valves, and tubing for leaks. Replace as necessary.

CAUTION!

- The compressed-air supply must be oil and moisture free. Contamination in the compressed air used to clean filters will result in poor cleaning, cleaning valve failure or poor collector performance.
- Purge compressed-air lines to remove debris before connecting to the unit's compressed-air manifold.
- Turn compressed-air supply OFF and bleed lines before performing service or maintenance work.

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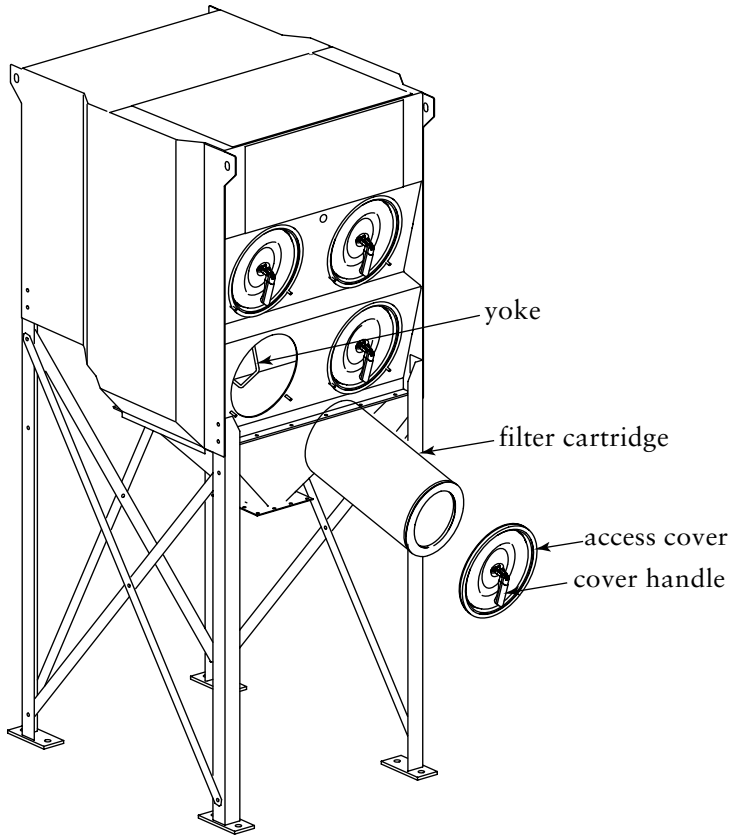
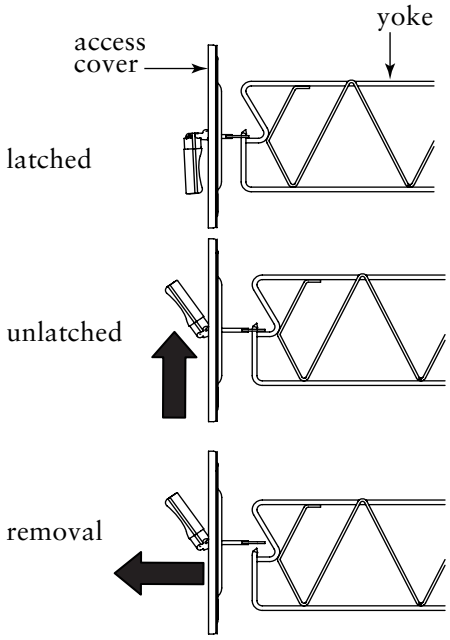
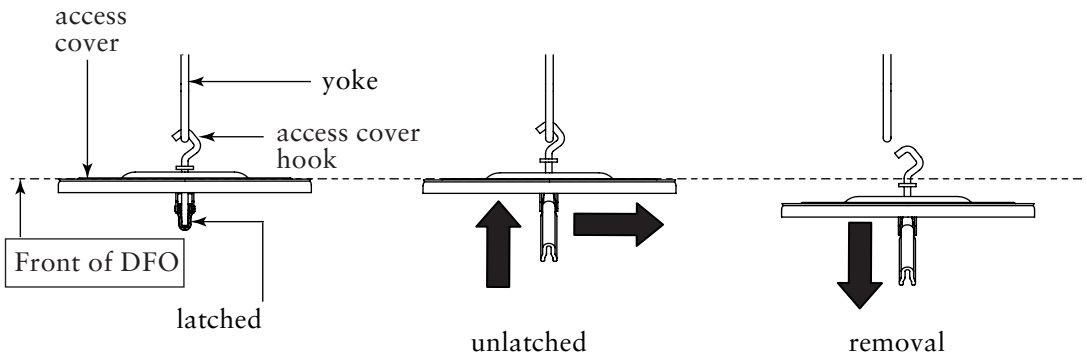


Filter Access Cover Removal (Side View)



Optional and Bag-In/Bag-Out Filter Access Cover Removal (Top View)



Filter Replacement

Optional Equipment

Power Pack

Radial Blade

The 3 through 10 horsepower power packs are designed to fit on top or side of the unit.

1. The power packs are shipped assembled and partial disassembly is required before installing.
2. Remove the blower housing fasteners and split the blower halves. The motor side contains the motor, half of the blower housing, and the blower wheel. The inlet side consists of the inlet half of the blower housing.
3. Mount the inlet side of the blower housing to the collector using the supplied bolts, washers, and nuts.

   Note: For side mount blowers, install the bolt-on adapter plate between the collector and the inlet side of the blower assembly.
4. Apply sealant around the blower housing flange and reassemble housing sections.
5. Rotate blower wheel manually to check clearance.
6. Position the optional exhaust grid over the power pack outlet, if equipped.

   Note: See Damper Installation if an optional damper control is used.

Backward Inclined

The 3 through 10 horsepower power packs are designed to fit on top or side of the unit.

1. The power packs are shipped assembled and partial disassembly is required before installing.
2. Remove eight motor-mount bracket fasteners and remove the motor, motor-mount bracket, and blower wheel as an assembly as shown.
3. Turn housing over and apply sealant toward the outside edge of the bolt pattern on the blower housing. Mount the blower housing to the collector using the inlet cone fasteners.

   Note: For a top-mounted TBI, install a spacer ring between the fan housing and the collector to provide the necessary clearance for the damper installation.

   For top-mount TBI with explosion vent, install the spacer spool between the blower housing and the collector to provid e the necessary clearance for explosion vent and weather dome. Position of the blower fan housing should not restrict explosion vent opening.
4. Apply sealant to the outside edge of the bolt pattern on the blower housing. Reinstall the motor, bracket, and blower wheel assembly. Align the tab on the blower housing with the slot in the motor-mount bracket.
5. Rotate blower wheel after installation to ensure proper clearance between the inlet cone and the blower wheel.
6. Position the optional exhaust grid over the power pack outlet, if equipped.

   Note: See Damper Installation if an optional damper control is used.

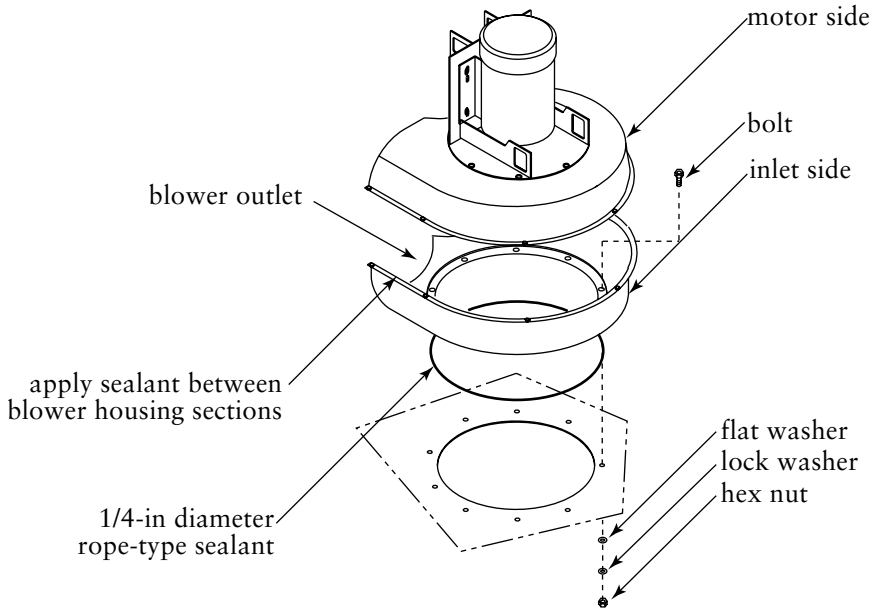
CAUTION!

BEFORE INITIAL OPERATION:

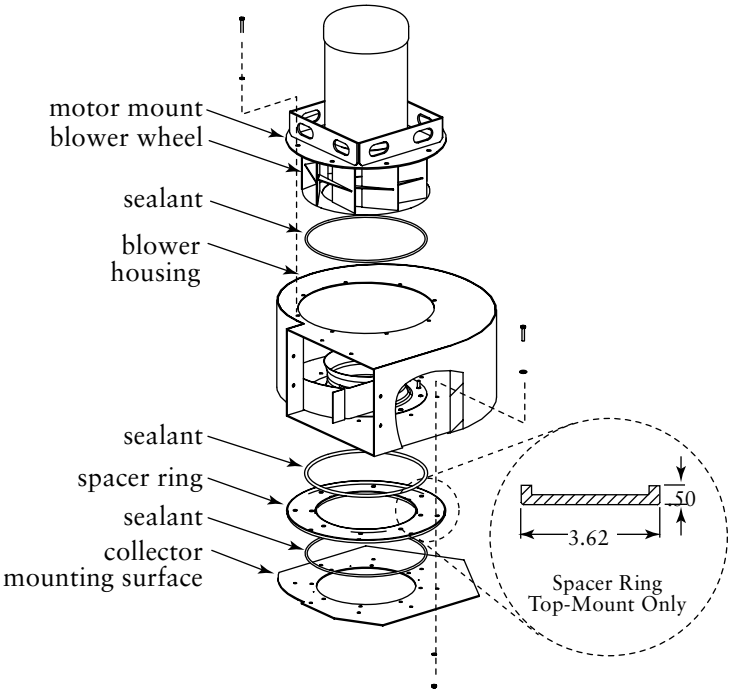
- Tighten all set screws in fan wheel.*
- Tighten all set screws in bearings.*
- Repeat after 8 hours of operation.
- Repeat again after two weeks of operation.

Reference Wheel Setscrew Torque Table in the Side-Mount Power Pack section.

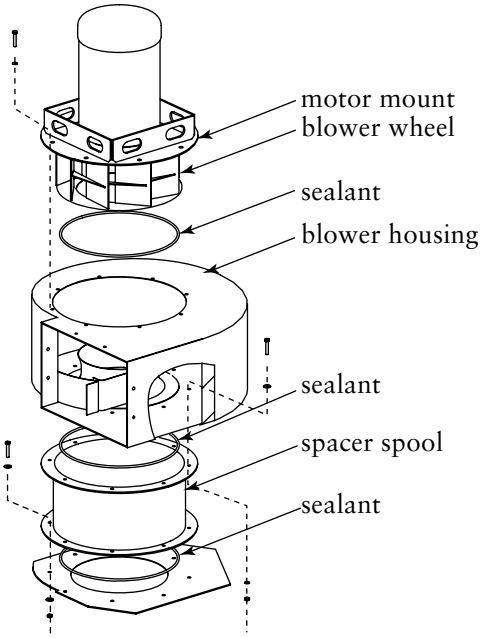
Radial Blade Power Pak, Top or Side Mount



TBI with Spacer Ring and TBI with Spacer Spool for Explosion Vented Units



Top Mount Power Pack with Spacer Ring



Top Mount Power Pack with Spacer Spool

Power Pack

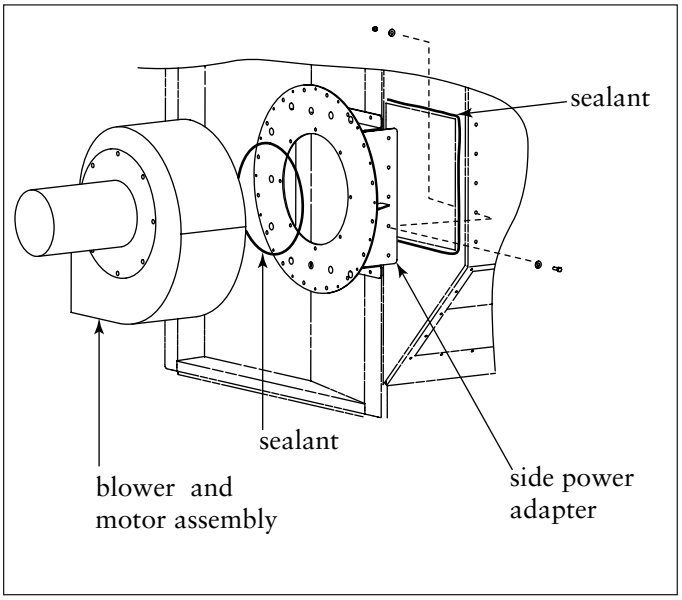
Side-Mount Power Pack for Units Built After July 2003

CAUTION!

- Side mounting a power pack requires side power adapter to support the weight of the power pack.
- Poorly installed power packs may not stay properly attached to the collector resulting in personal injury and damage to equipment or property.

1. Disconnect power supply.
2. Apply 1/4-in diameter rope-type sealant to the outside surface of the power adapter between the fan mount bolt holes and the round fan inlet hole.
3. Install the fan housing to the power adapter using 3/8 x 1 1/4-in bolts, flat washers, and hex nuts.

   Note: Install bolts with the bolt head in the fan housing and the threaded end in the power adapter.



Side-Mount Power Pack Field Installation

4. Install the motor and blower assembly to the fan housing using the original hardware and caulk sealant.
5. Connect power supply to the motor. Turn the fan motor ON then OFF to check motor rotation by referencing the rotation arrow on the blower.

   Note: To change rotation on three phase units, turn power supply OFF and switch any two leads on the output side of the fan motor starter.

CAUTION!

BEFORE INITIAL OPERATION:

- Tighten all set screws in fan wheel.*
- Tighten all set screws in bearings.*
- Repeat after 8 hours of operation.
- Repeat again after two weeks of operation.

Reference Wheel Setscrew Torque Table below.

Setscrew Size Diameter	Carbon Steel Setscrew Torque*	
In.	Lb. - In.	Lb. - Ft.
1/4	75	6.2
5/16	144	12
3/8	252	21
7/16	396	33
1/2	600	50
5/8	1164	97
3/4	2016	168
7/8	3204	267
1	4800	400

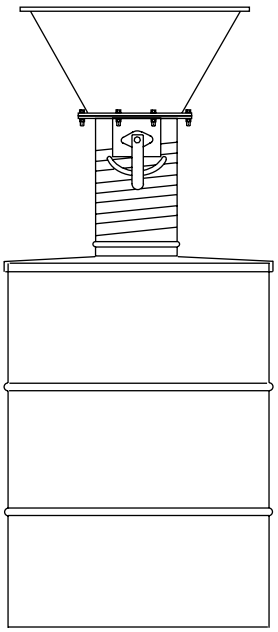
* Stainless steel setscrews are not hardened and should not be tightened to more than half of the values shown.

Wheel Setscrew Torque

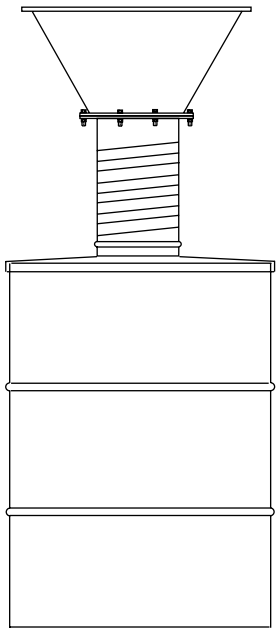
55-Gallon Drum Pack

The drum pack is designed to fit a customer-supplied, standard 55-gallon drum and provides easy access for dust removal and disposal. A flexible hose connects the drum cover hopper. Placing a pallet under the drum allows heavier materials to be moved quickly using a forklift or pallet jack. If a pallet is used, the length of flexible hose may need to be shortened.

1. Place 1/4-in diameter rope-type sealant between the hopper flange and the drum cover mounting flange toward the inside edge of the bolt pattern.
2. Fasten using the bolts, washers, and nuts supplied.
3. Attach the drum cover to the 55-gallon drum.
4. Use latches to secure the cover to the drum, if equipped.



Drum Cover Pack
with Gate Valve



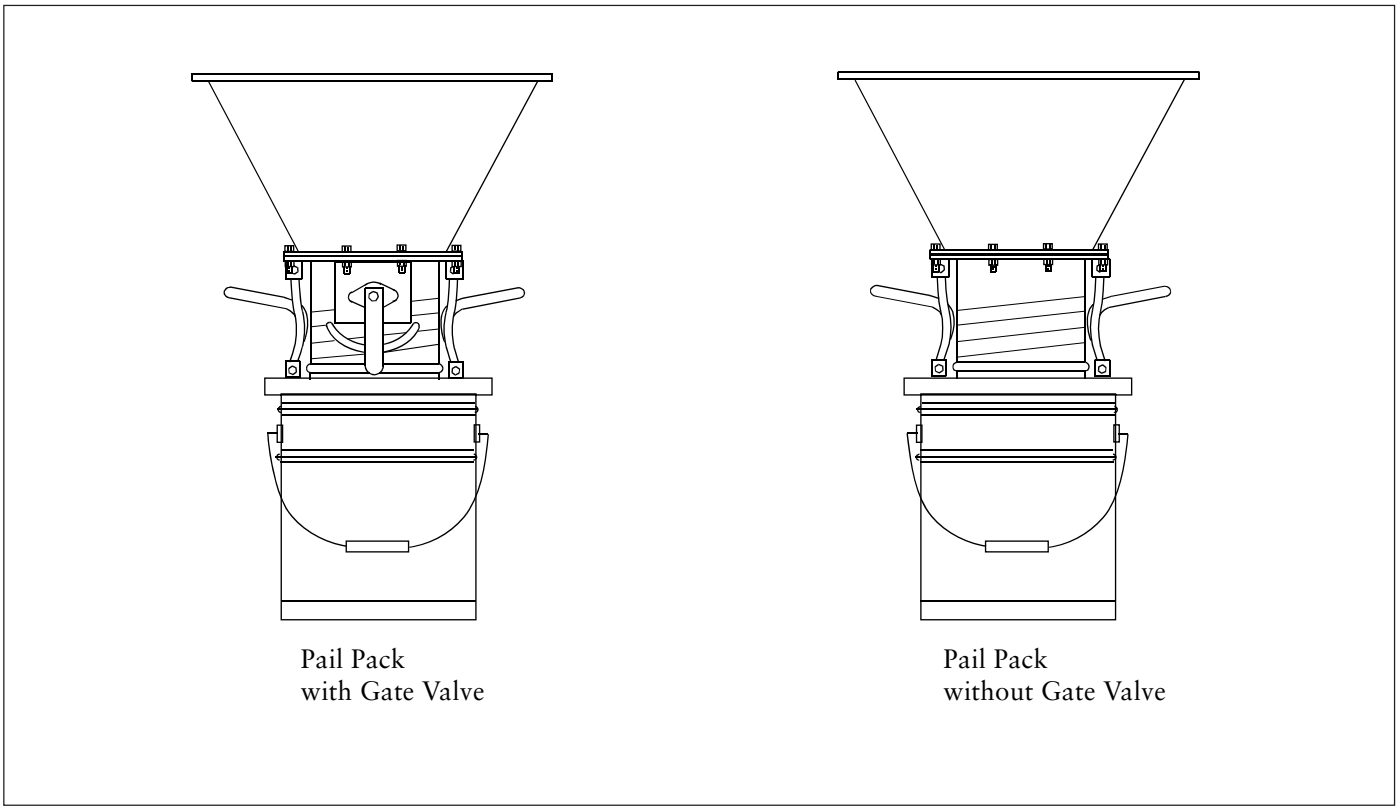
Drum Cover Pack
without Gate Valve

55-Gallon Drum Pack with and without Gate Valve

5-Gallon Pail Pack

The pail pack includes a 5-gallon pail and provides easy access for dust removal and storage.

1. Apply sealant to the hopper flange or the pail cover mounting plate flange toward the inside edge of the bolt pattern.
2. Fasten the pail pack to the hopper using the bolts, washers, and nuts supplied.
3. Place pail beneath sealer mechanism.
4. Tighten clamps on either side by pulling down.



5-Gallon Pail Pack with and without Gate Valve

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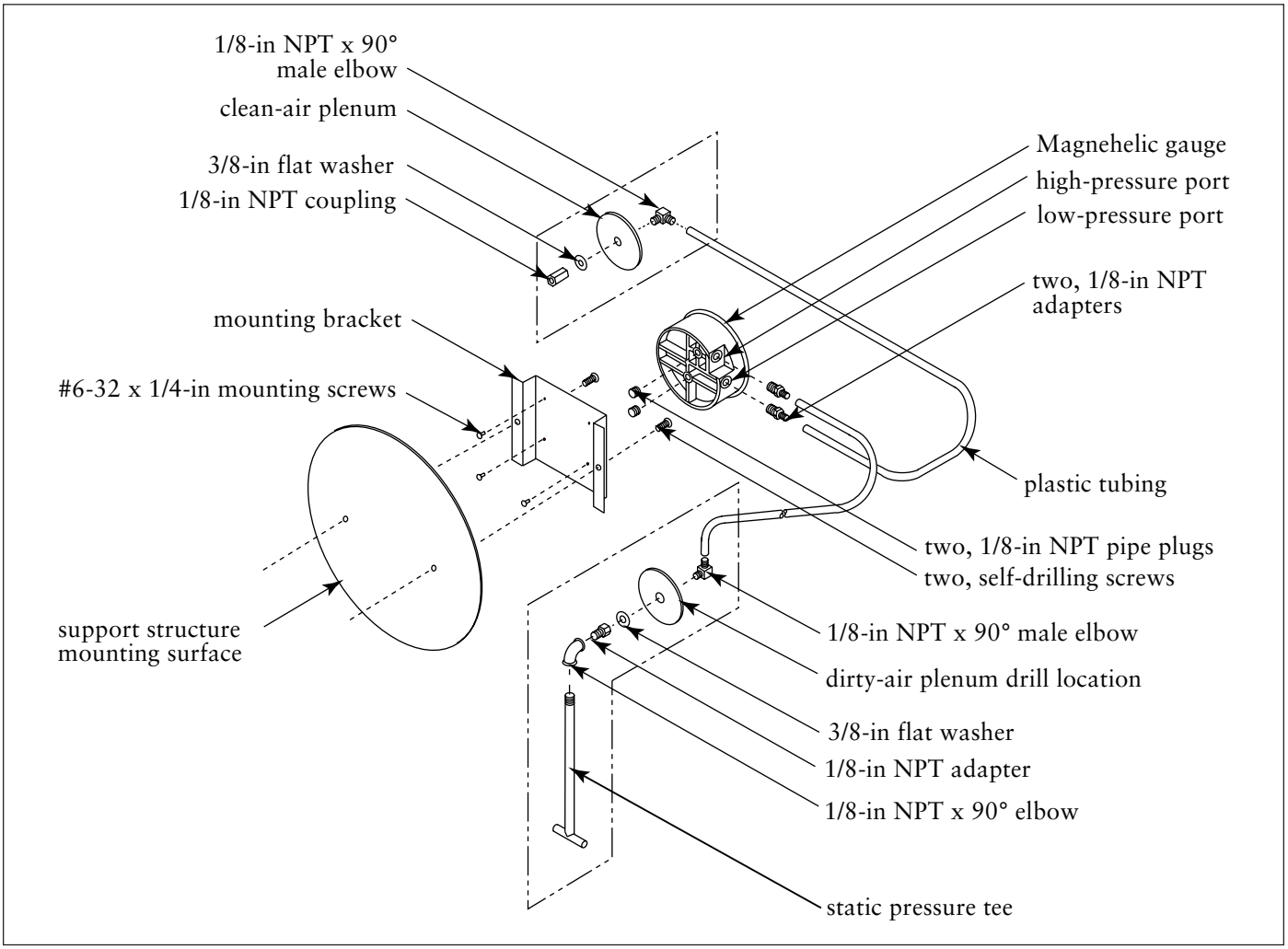
Magnehelic Gauge

The Magnehelic is a differential pressure gauge used to measure the pressure difference between the clean- and dirty-air chambers and provides a visual display of filter change requirements. The high-pressure tap is located in the dirty-air plenum and the low-pressure tap is located in the clean-air plenum.

1. Choose a convenient, accessible location on or near the unit for mounting that provides the best visual advantage.

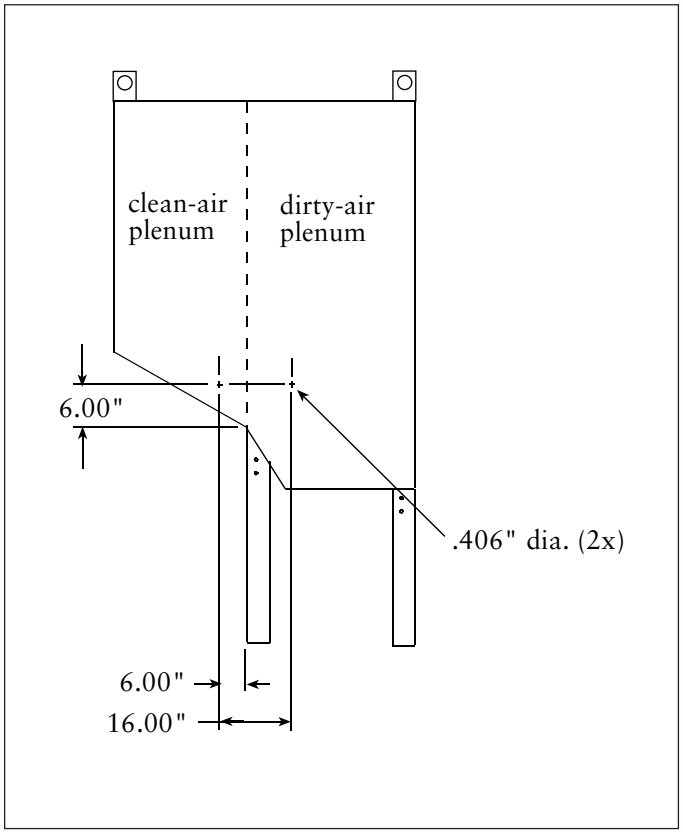
If unit is equipped with factory-installed pressure taps, skip to Step 5.

2. Before drilling, place a piece of non-combustible cloth over the filter opening in the clean-air plenum to protect the filters from drilling chips.
3. Place a piece of wood behind the drill location in the dirty-air plenum to protect the filters from damage by the drill bit. Use a 0.406-inch diameter bit to drill the holes as shown in Magnehelic Gauge, Detail A.
4. Mount the pressure tap hardware on the clean-air plenum panel. Mount the pressure tap with the tee inside the dirty-air plenum.
5. Plug the pressure ports on the back of the gauge using two 1/8-in NPT pipe plugs supplied. Install two 1/8-in NPT male adapters supplied with the gauge into the high- and low-pressure ports on the side of the gauge. Attach the mounting bracket using three #6-32 x 1/4-in screws supplied.



Magnehelic Gauge Installation

6. Mount the gauge and bracket assembly to the supporting structure using two self-drilling screws.
7. Thirty-five feet of plastic tubing is supplied and must be cut in two sections. Connect one section of tubing from the gauge's high-pressure port to the pressure fitting located in the dirty-air plenum. Connect remaining tubing from the gauge's low-pressure port to the fitting in the clean-air plenum. Additional tubing can be ordered from your representative.
8. Carefully remove the cloth protecting the filters. Close access doors and tighten securely by hand.
9. Zero and maintain the gauge as directed in the manufacturer's Operating and Maintenance Instructions provided.



Magnehelic Gauge, Detail A

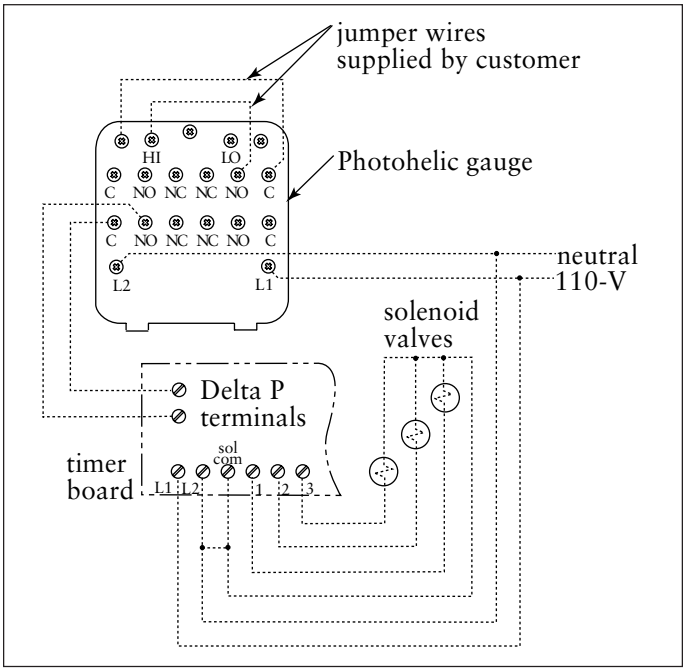
Photohelic Gauge

The Photohelic combines the functions of a differential pressure gauge and a pressure-based switch. The gauge function measures the pressure difference between the clean- and dirty-air plenum and provides a visual display of filter condition. The high-pressure tap is located in the dirty-air plenum and a low-pressure tap is located in the clean-air plenum. The pressure-based switch function provides high-pressure ON and low-pressure OFF control of the filter cleaning system.

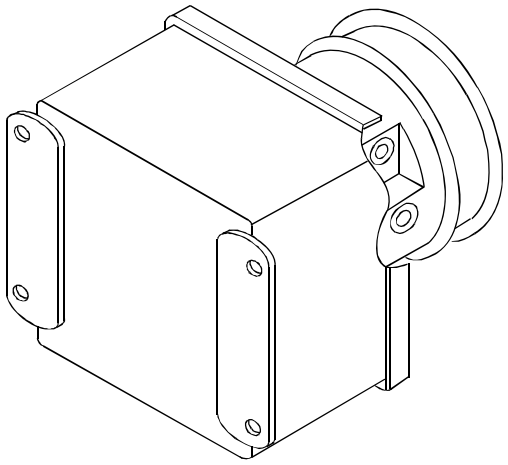
CAUTION!

- Electrical installation must be performed by a qualified electrician and comply with all applicable national and local codes.
- Turn power OFF during installation or maintenance.
- Do not install in classified hazardous atmospheres without an enclosure rated for the application.

1. Choose a convenient, accessible location on or near the unit for mounting that provides the best visual advantage.
2. Mount the gauge to the remote panel or door using the mounting ring, retaining ring, and four #6-32 x 1 1/4-in screws. Do not tighten screws. Connect two 1/8-in NPT x 1/4-in OD male adapters to the gauge's high- and low-pressure ports. Align the adapters to the 2.375-in hole in the right-hand side of the mounting bracket. Tighten screws.
3. On the back of the gauge, remove four #6-32 x 5/16-in screws and plastic enclosure. Set aside. Add two jumper wires supplied by customer. Remove the jumper from the pressure switch located on the timer board, if equipped. Using the 3/4-in conduit opening, wire the gauge as shown. Reassemble and fasten the enclosure securely.



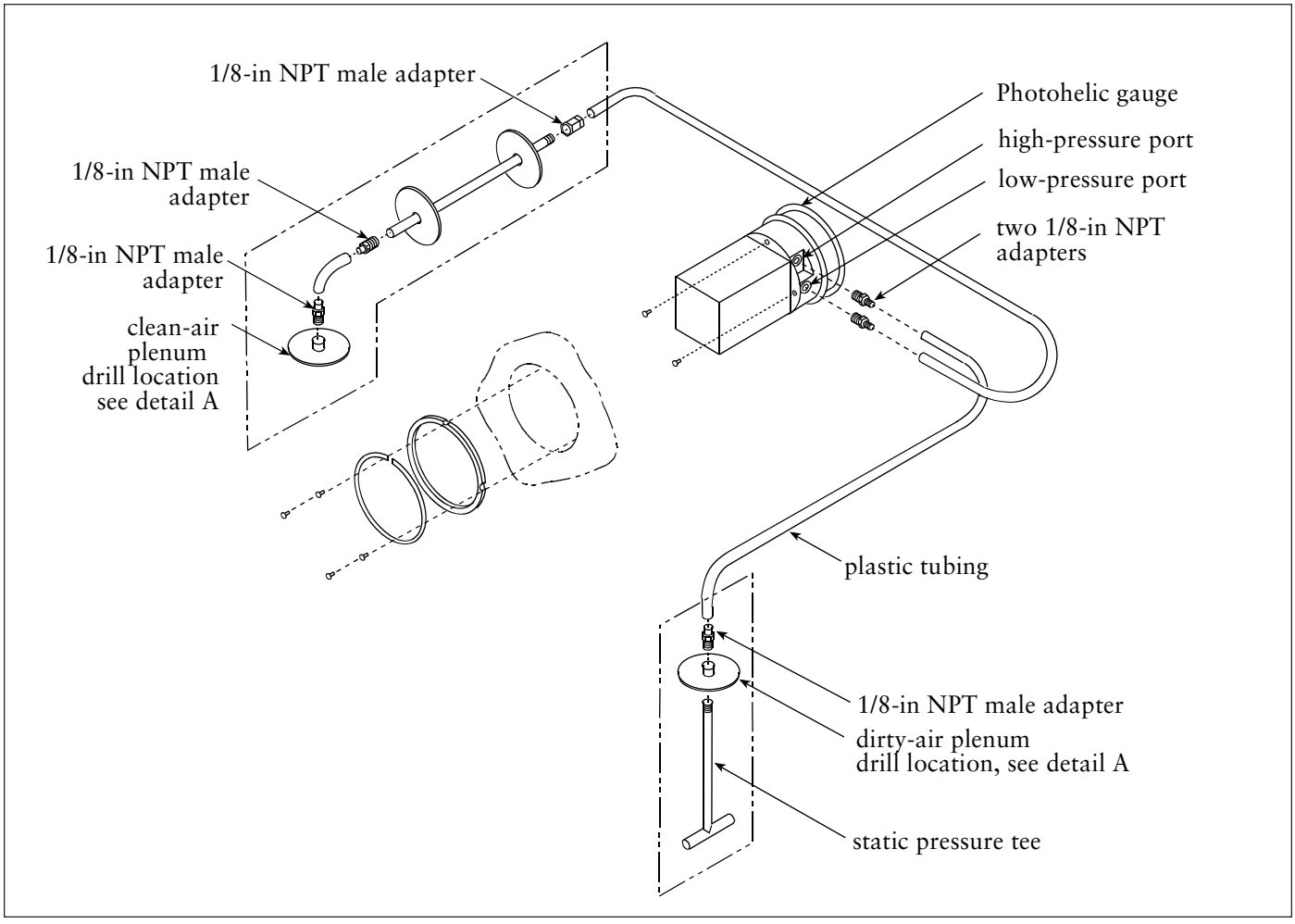
Photohelic Gauge Wiring Diagram



Note:
For use with solid-state timer only.
All parts, except the mounting bracket shown in the Photohelic Gauge Standard Installation drawing are included with the NEMA 4, Weatherproof Enclosure.

Photohelic Gauge in Optional NEMA 4 Weatherproof Enclosure

4. Thirty-five feet of plastic tubing is supplied and must be cut in two sections. Connect one section of tubing from the gauge's high-pressure port to the pressure fitting located in the dirty-air plenum. Connect remaining tubing from the gauge's low-pressure port to the fitting in the clean-air plenum. Additional tubing can be ordered from your representative.
5. Zero and maintain the gauge as directed in the manufacturer's Operating and Maintenance Instructions provided.
6. To install the Photohelic gauge mounted in a NEMA 4, Weatherproof Enclosure, follow Steps 4 and 5.



Photohelic Gauge, Remote Panel or Door Installation

Delta P Control

Description

The Delta P Control monitors the differential pressure between the clean and dirty air plenums, providing a visual display of the filter condition. When combined with a pulse timer, it controls the pressure drop by turning the cleaning mechanism On and Off at the chosen limits. There are three (3) set points: High Pressure On, Low Pressure Off, and Alarm. The first two, High Pressure On and Low Pressure Off, control the filter cleaning system. The third, Alarm, provides a relay output to activate an external alarm supplied by others.

Operation

Normal

The Delta P Control monitors the pressure in the clean and dirty air plenums while the unit is running. The blower draws air through the filters, creating a pressure drop. The Delta P control measures the pressure drop and provides a visual display in inches water gauge or metric (SI) units.

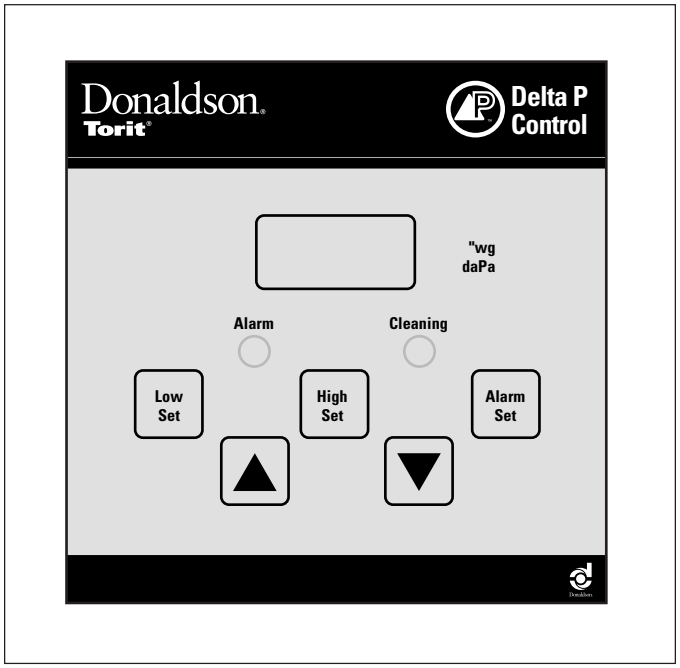
Filter Cleaning

When the pressure drop across the filter bags reach the control's High setpoint, the control closes an output relay allowing a timer to trigger the cleaning valves sequentially. When the control senses that the pressure drop has decreased to the Low setpoint, the relay opens and the cleaning cycle stops. This sequence continues as long as the collector is in use, maintaining the pressure drop within a narrow range.

Alarm

The alarm setpoint is set to a higher setting than used to start the filter cleaning cycle. It indicates situations when the cleaning system cannot reduce the pressure drop due to cleaning system failure, lack of compressed air, or the end of the filter's useful life. There is a time delay prior to setting the alarm to prevent nuisance trips. The Delta P Control also provides an input connection for a remote alarm reset.

For complete information, see the most current version of the Delta P Installation, Operation, and Maintenance manual.



Delta P Control Display

Delta P Plus Control

The Delta P Plus Control monitors the differential pressure between the clean and dirty air plenums, providing a visual display of the filter condition. When combined with a pulse timer, it controls the pressure drop by turning the cleaning mechanism On and Off at the chosen limits. There are three (3) set points: High Pressure Drop On, Low Pressure Drop Off, and Alarm. The first two, High Pressure Drop On and Low Pressure Drop Off, control the filter cleaning system. The third, Alarm, provides a relay output to activate an external alarm supplied by others.

The user can program the Delta P Plus Control to pulse while the collector is running, to maintain a relatively constant pressure drop across the filters, pulse only after the collector is shut down (after-shift cleaning), or a combination of both, cleaning while running as well as end of the shift.

Operation

Normal

The Delta P Plus Control monitors the pressure on both sides of the tubesheet while the unit is running. The blower draws air through the filters, creating a pressure drop. The Delta P Plus Control measures the pressure drop and provides a visual display in inches water gauge or metric (SI) units.

Filter Cleaning

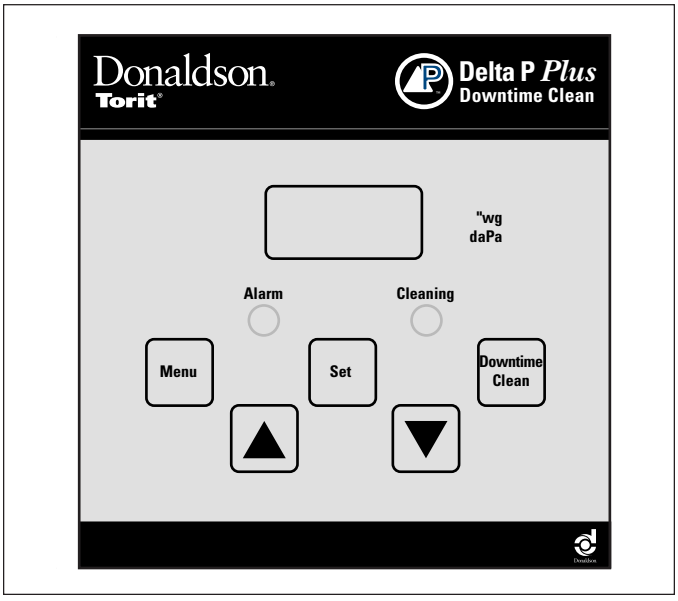
The Delta P Plus Control offers three filter cleaning options.

1. Differential Pressure Cleaning (DFF) - When the pressure drop across the filters reaches the control's High setpoint, the control closes an output relay allowing a sequential timer to trigger the cleaning valves. When the control senses that the pressure drop has decreased to the Low setpoint, the relay opens and the cleaning cycle stops. This sequence continues as long as the collector is in use, maintaining the pressure drop within a narrow range.
2. Down Time Cleaning (DTC) - The Delta P Plus Control monitors the collection system. It watches for the blower to start, the pressure drop to exceed the Low setpoint, and then for the pressure drop to approach zero. After the blower has come to a stop, the Delta P Plus engages the cleaning mechanism for a pre-selected time.
3. Combined Differential and Down Time Cleaning (ALL) - The Delta P Plus Control combines the two functions described above; maintaining the pressure drop in a narrow band and down time cleaning the filters when the collector is shut down. The down time cleaning function can be toggled On or Off from the keyboard.

Alarm

The alarm setpoint is set to a higher setting than used to start the filter cleaning cycle. It indicates situations when the cleaning system cannot reduce the pressure drop due to cleaning system failure, lack of compressed air, or the end of the filter's useful life. There is a time delay prior to setting the alarm to prevent nuisance trips. The Delta P Plus Control also provides an input connection for a remote alarm reset.

For complete information, see the most current version of the Delta P Plus Installation, Operation, and Maintenance manual.



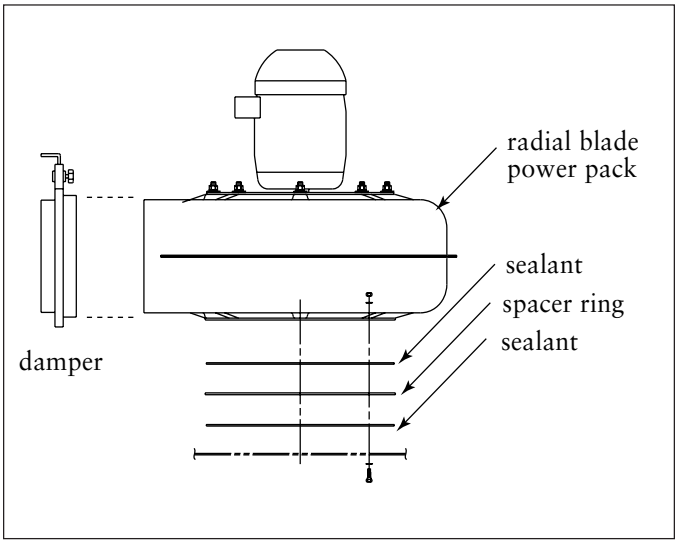
Delta P Plus Control Display

Damper Installation

A damper can be added to the power pack outlet to limit and regulate airflow when unit is in operation.

Radial Blade

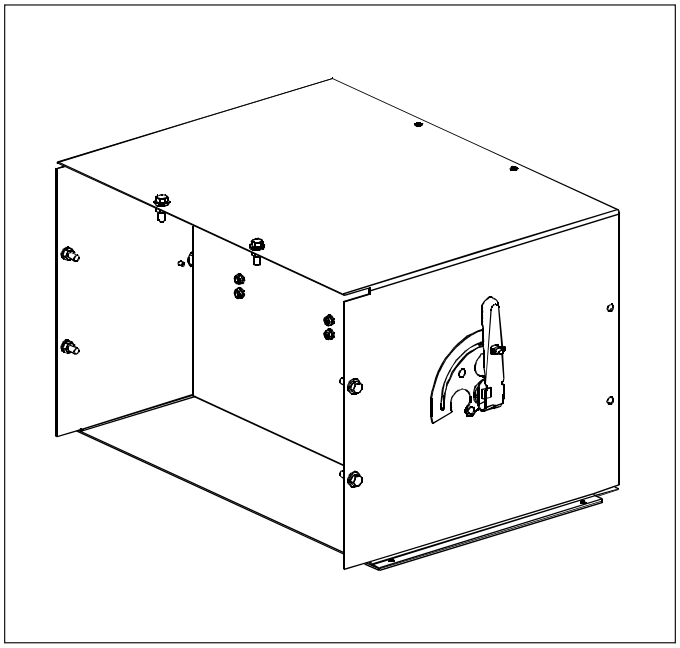
1. Apply 1/4-in diameter bead of sealant toward the inside edge of the bolt pattern on both sides of the spacer ring.
2. Position the spacer ring on the unit's clean-air outlet and align bolt patterns.
3. Apply silicone sealant, supplied with blower, around the blower outlet.
4. Slide the damper collar over the blower outlet and secure using four equally spaced self-drilling screws supplied.
5. Loosen the wing nut on the damper and adjust from 30 to 50% closed.



Radial Blade Power Pack with Damper

Backward Inclined

1. Apply sealant around the inside edge of the bolt pattern on the power pack outlet.
2. Fasten damper to the blower outlet using the hardware provided.



Damper for Backward Inclined Power Pack

Exhaust Grid Installation

Radial Blade

1. Fit the exhaust grid over the radial blade outlet or the damper assembly, if equipped.
2. Fasten using three self-drilling screws supplied.

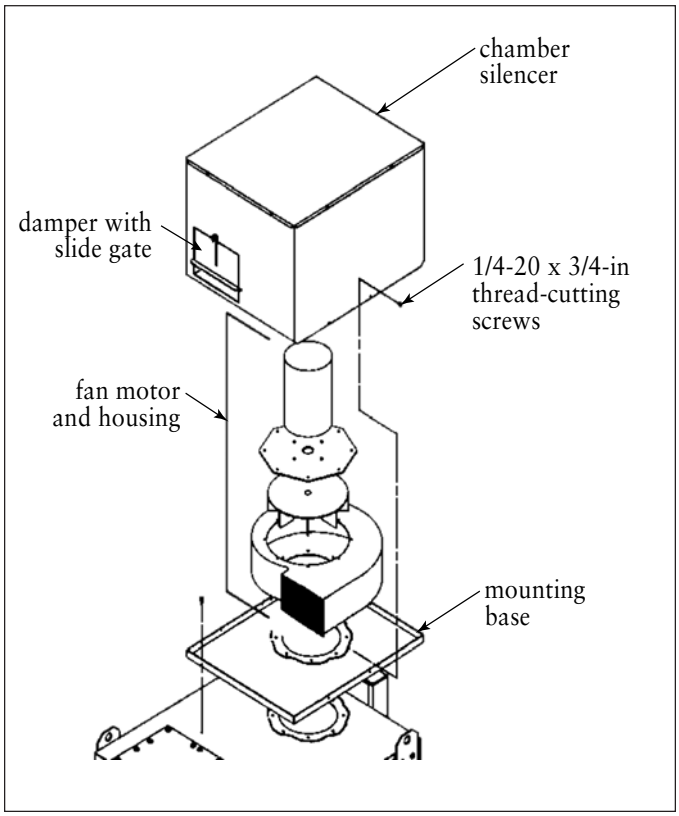
Backward Inclined

1. Attach flanges to the backward inclined outlet using the fasteners supplied.
2. Fasten exhaust grid to flanges using the supplied fasteners.

Plenum Silencer

Radial Blade and Backward Inclined

1. Apply 1/4-in diameter rope-type sealant towards the outside edge of the bolt pattern on the clean-air outlet.
2. Position the silencer mounting base aligning the bolt patterns of the collector and the mounting base.
3. Apply 1/4-in diameter rope-type sealant towards the outside edge of the bolt pattern on the silencer mounting base.
4. Install the blower housing, align holes, and secure using the supplied hardware.
5. Assembly the remaining power pack components as described in Power Pack Assembly on Page 12.
6. Attach the plenum silencer to the base using self-threading bolts with washers.
7. Route rigid or flexible conduit from the junction box on the motor to the outside wall of the silencer to house wiring.
8. Install the top of the silencer using the supplied hardware.
9. Loosen the wing nut on the damper and adjust from 30 to 50% closed.

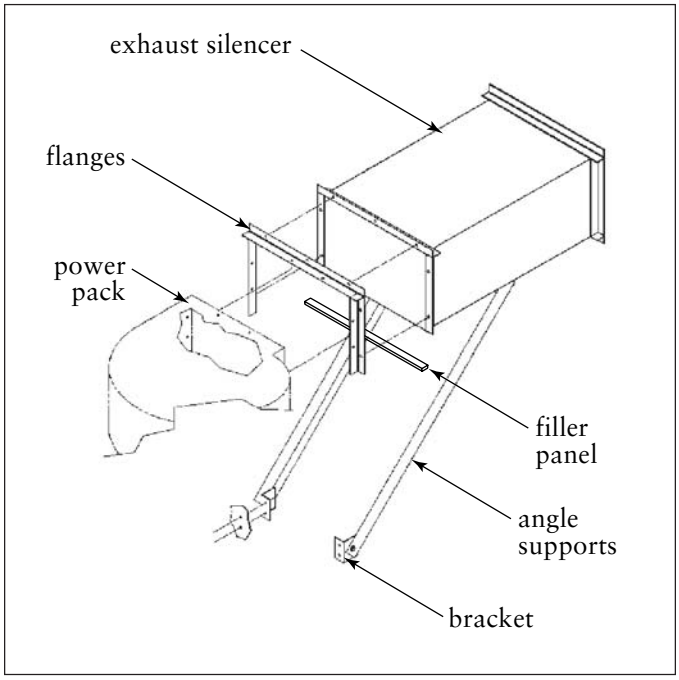


Power Pack with Plenum Silencer

Exhaust Silencer

Backward Inclined Only

1. Attach flanges to the power pack outlet using the supplied bolts, washers, and nuts.
2. Apply sealant to the flange and attach silencer to flange. Tighten all hardware.
3. Loosely assemble the silencer's support brackets.
4. Align the pivoting support brackets to extend a minimum of 30-inches from the collector and mark the drill locations.
5. Drill pilot holes with a 0.339-inch bit.
6. Secure brackets using 3/8-in thread-forming bolts.
7. If a gap exists between the silencer and the damper, install the panel filter using the screws provided.

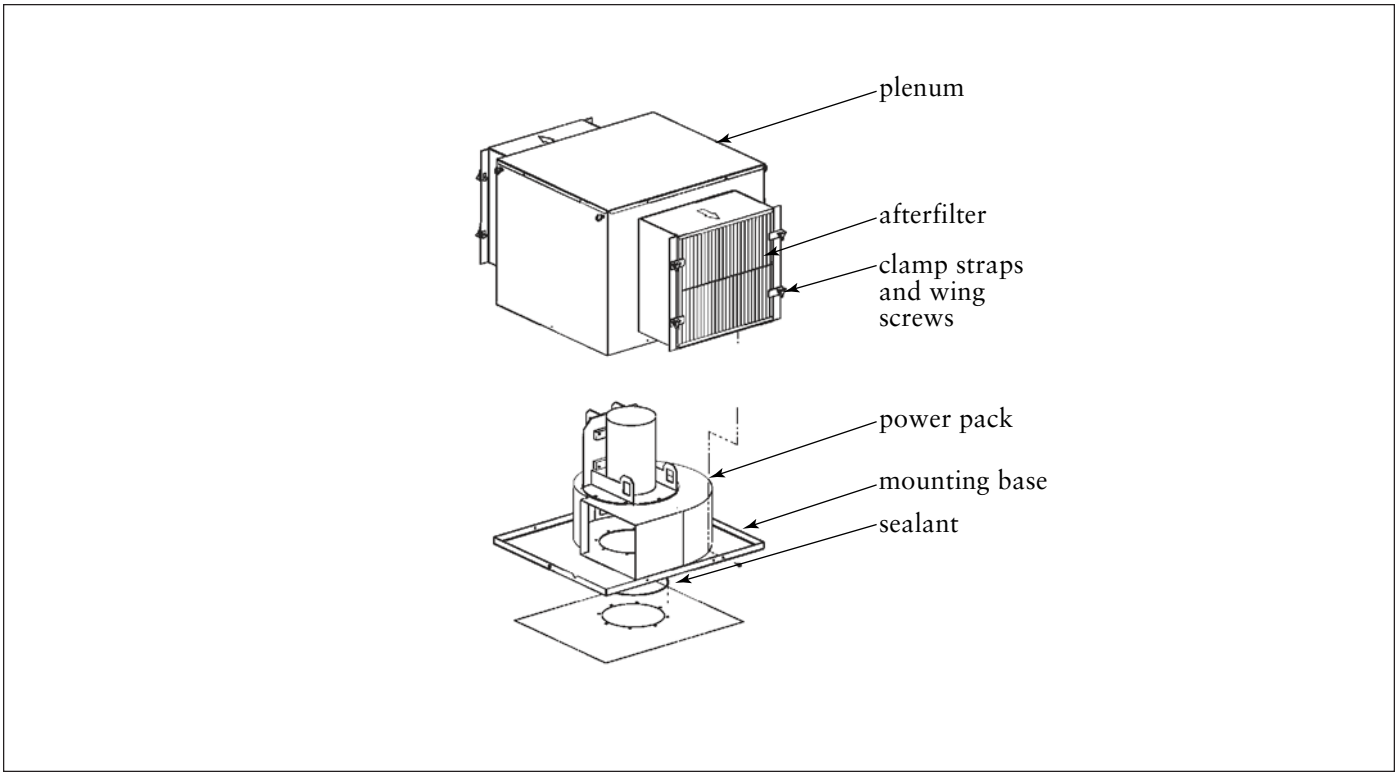


Power Pack with Exhaust Silencer

HEPA or ASHRAE Afterfilter Installation

The afterfilter plenum is mounted on top of the unit and the blower is positioned inside the plenum.

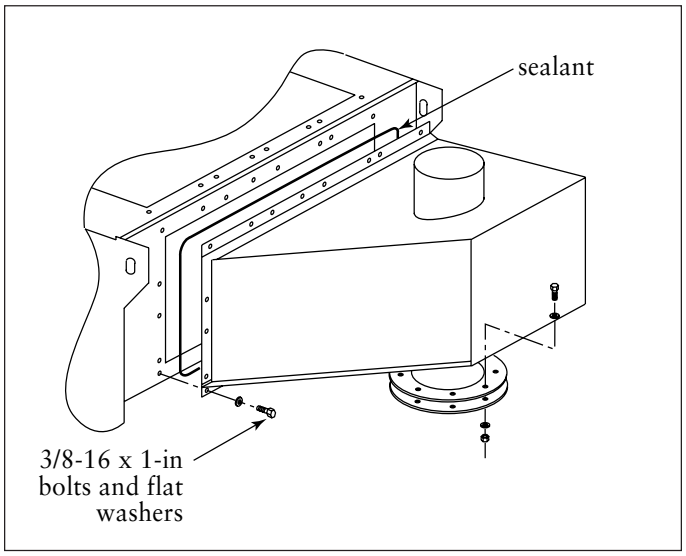
1. Apply sealant around the clean-air outlet toward the outside edge of the bolt hole pattern located on the top of the collector.
2. Position the afterfilter plenum mounting base aligning the bolt patterns.
3. Apply sealant to the plenum mounting base toward the outside edge of the bolt pattern.
4. Install the blower housing, align bolt holes, and fasten securely in place using hardware supplied with the power pack.
5. Assemble the remaining power pack components as described in Power Pack.
6. Apply sealant to the inside perimeter of the mounting base. Install the plenum to the mounting base using self-threading bolts with washers.
7. Install 1/2-in conduit using the holes on the back of the afterfilter plenum. Flexible or rigid conduit can be used.
8. Apply sealant to the plenum's top flange and use self-treading bolts and washers to secure the plenum top to the plenum.
9. Install the afterfilters in the afterfilter frames. Install HEPA filters with the gasket toward the inside of the frame. Install ASHRAE filters with the airflow direction arrow pointing outside.
10. Position the clamp straps and tighten the wing screws securely.



HEPA and ASHRAE Afterfilter Installation

Abrasion-Resistant Inlet Collar

1. Remove the unit's front cover plate. Remove excess sealant from opening.
2. Apply 1/4-in sealant around the opening toward the inside edge of the bolt pattern.
3. Align the holes on the inlet collar with the holes in the unit and secure using 3/8-16 x 1-in bolts and flat washers supplied.



Abrasion-Resistant Inlet Collar

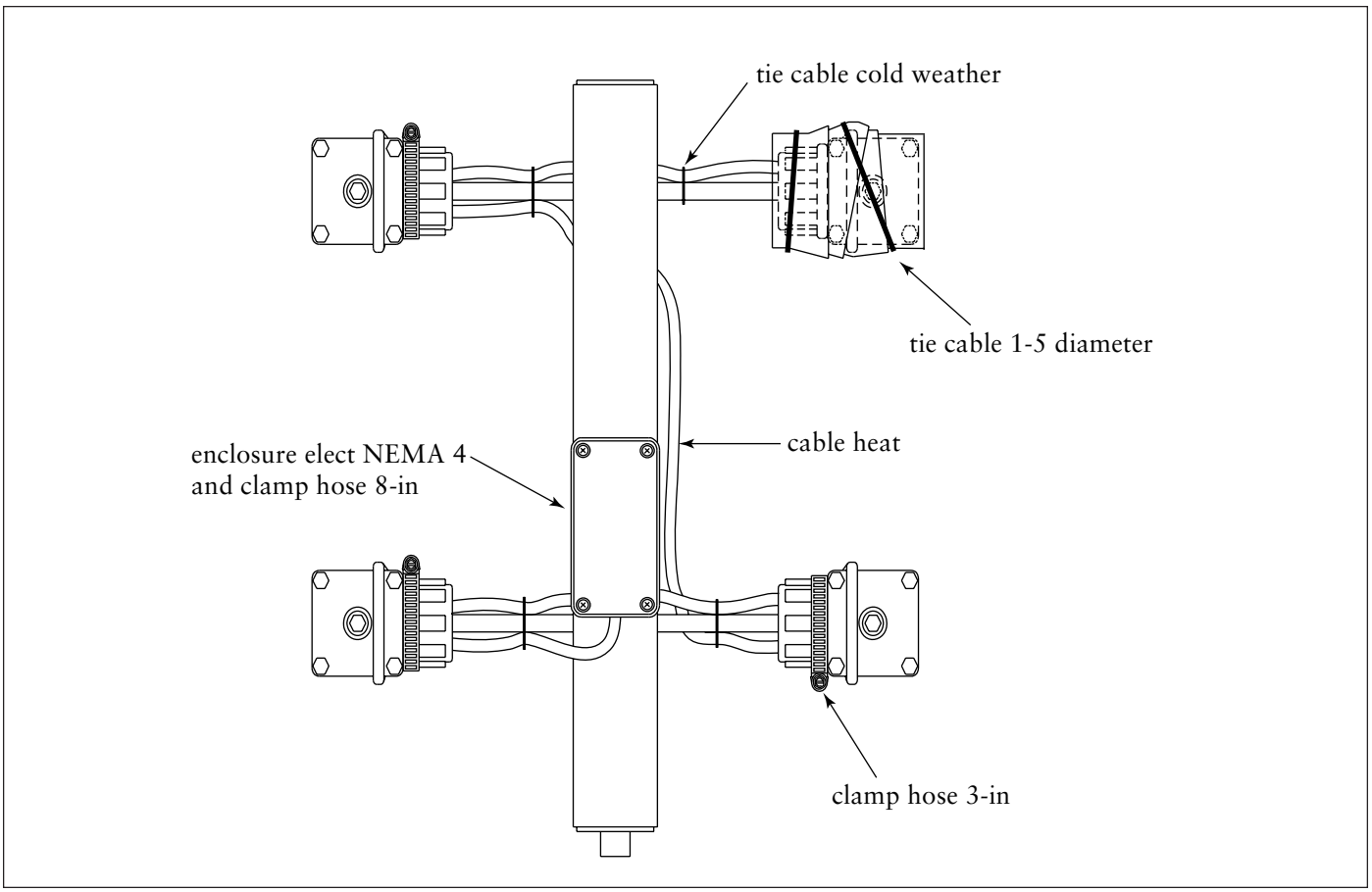
Cold Climate Kit

A cold climate kit provides heat to the pulse valves to prevent cold weather freeze up. The basic kit, for use in applications that have a moderate of moisture in the compressed-air supply, consists of a small heating element and thermostat installed in the solenoid enclosure. The basic kit is factory-installed and supplied with the appropriate solenoid wiring instructions.

A heavy-duty kit is available for applications that have moderate-to-high amounts of moisture in the compressed-air supply and consists of the basic kit plus a heat cable to deliver heat to the large pulse valves. This kit is customer installed and detailed installation instructions are provided.

1. Install the power connection kit on the heat cable following the manufacturer's instructions.
2. Start with the upper right-hand valve, wrap heat cable around the valve. Pull heat cable tight.

   Note: Double wrap between the valve's mounting flange and the square valve cover.
3. Position a 3-in hose clamp around the double wrapped heat cable and tighten securely.
4. Wrap remaining valves the same way.
5. Drill a 1-in diameter hole in the back of the junction box. Assemble the power connection kit following the manufacturer's instructions.
6. Secure junction box to the collector using two self-drilling screws.
7. Wrap 6-ft of pipe insulation tape around each heat-cable wrapped valve. Wrap the entire valve, double wrapping the hose-clamped heat cable. Secure with cable ties.



Heavy-Duty Cold Climate Kit

Explosion Vents

CAUTION!

- Personal injury or property damage can result from material discharge during venting.
- The material discharged from an enclosure during the venting of an explosion should be directed safely to an outside location.
- The risk of damage or injury can be minimized or avoided by locating vented equipment outside buildings and away from normally occupied areas.
- Standard explosion vents are intended for outdoor installations only.

Note: Remove all shipping materials, including covers, from the explosion relief vents prior to installation. Failure to remove shipping covers will seriously compromise explosion vent operation.

- Explosion relief vents must be safely directed outdoors away from personnel, buildings, property, offices, walkways, and catwalks to reduce risk of damage to property and personal injury. Explosion venting calculations are based on formulas from NFPA-68, for outdoor applications only, with no duct or obstructions on the explosion vent panel.
- Explosion vents are suitable for negative pressure installations only.
- Contact Donaldson Torit for assistance in calculating safe and specific venting requirements for equipment.

Sprinkler Installation

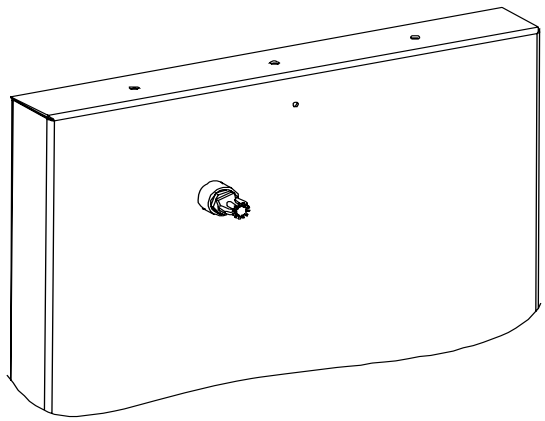
CAUTION!

Sprinkler systems place a large quantity of water in the dust collector when activated. Provide adequate drainage to remove water. Excess water weight can cause the leg structure to collapse.

Optional fire control sprinklers are available for all models operating under negative pressure. Torit-supplied sprinklers require a minimum of 15-psig water pressure to each module. The volume of water discharged per sprinkler head is 17 gallons per minute.

Note: Consult with local authorities when installing fire control systems on dust collection equipment.

1. Remove the top filter access doors and filters to access the sprinkler taps located inside the dirty-air plenum.
2. Apply pipe sealant to the threads of the pipe reducer located on the sprinkler assembly.
3. Thread sprinkler assembly onto the 1-in diameter sprinkler tap.
4. Tighten securely.



access from inside the dirty-air plenum

Sprinkler Installation

Troubleshooting

Problem	Probable Cause	Remedy
Blower fan and motor do not start	Improper motor wire size	Rewire using the correct wire gauge as specified by national and local codes.
	Not wired correctly	Check and correct motor wiring for supply voltage. See motor manufacturer's wiring diagram. Follow wiring diagram and the National Electric Code.
	Unit not wired for available voltage	Correct wiring for proper supply voltage.
	Input circuit down	Check power supply to motor circuit on all leads.
	Electrical supply circuit down	Check power supply circuit for proper voltage. Check for fuse or circuit breaker fault. Replace as necessary.
Blower fan and motor start, but do not stay running	Incorrect motor-starter installed	Check for proper motor starter and replace if necessary.
	Access doors are open or not closed tight	Close and tighten access doors. See Filter Installation and Replacement.
	Hopper discharge open	Install slide gate or drum cover arrangement to hopper discharge. See Hopper Assembly.
	Blower fan damper control not adjusted properly	Check airflow in duct. Adjust damper control until proper airflow is achieved and the blower-motor's amp draw is within the manufacturer's rated amps.
	Electrical circuit overload	Check that the power supply circuit has sufficient power to run all equipment.
Clean-air outlet discharging dust	Filter cartridges not installed correctly	See Filter Installation and Replacement.
	Filter cartridge damage, dents in the end caps, gasket damage or holes in pleated media	Replace filters as necessary. Use only genuine Donaldson replacement parts. See Filter Installation and Replacement.
	Access cover(s) loose	Tighten access doors securely. See Filter Installation and Replacement.
Insufficient airflow	Fan rotation backwards	Proper fan rotation is clockwise when looking down at the blower motor. See Preliminary Start-Up Check.

Problem	Probable Cause	Remedy
Insufficient airflow continued	Access doors open or not closed tight	Check that all access doors are in place and secured. Check that the hopper discharge opening is sealed and that optional attachments are installed correctly. See Hopper Assembly.
	Fan exhaust area restricted	Check fan exhaust area for obstructions. Remove material or debris. Adjust damper flow control.
	Filter cartridges need replacement	Remove and replace using genuine Donaldson replacement filters. See Filter Installation and Replacement.
	Lack of compressed air	Check that a maximum 60-psig is supplied. See Compressed Air Installation.
	Pulse cleaning not energized	Use a voltmeter to check supply voltage to the timer board. Check and replace the fuse on the timer board if necessary. See Solid-State Timer Installation.
	Dust storage area overfilled or plugged	Clean out dust storage area. See Dust Disposal.
	Pulse valves leaking compressed air	Lock out all electrical power to the unit and bleed the compressed-air supply. Check for debris, valve wear, or diaphragm failure by removing the diaphragm cover on the pulse valves. Check for solenoid leaks or damage. If pulse valves or solenoid valves and tubing are damaged, replace.
	Solid-State Timer failure	Using a voltmeter, check supply voltage to the timer board. Check and replace the fuse on the timer board if necessary. If the fuse is good and input power is present but output voltage to the solenoid valves is not, replace the timer board. See Solid-State Timer Installation.
	Solid-State Timer out of adjustment	See Solid-State Timer Installation.
No display on the Delta P control	No power to the control	Use a voltmeter to check for voltage at Terminal TB1.
	Fuse blown	Check the fuse in the F1 fuse tower. Replace if necessary.

Troubleshooting

Problem	Probable Cause	Remedy
Display on Delta P control does not read zero when at rest	Out of calibration	Disconnect pressure tubing. See Delta P Maintenance Manual, IOM 7546301.
	With collector discharging outside, differential pressure is present from indoor to outdoor	Recalibrate with the pressure tubing attached as described in the Delta P Maintenance Manual, IOM 7546301.
Delta P control ON, but cleaning system does not start	Not wired to the timing board correctly	Connect the pressure switch on the timer board to Terminals 7 and 8 on TB3.
	Faulty relay	Using a multimeter, test relay for proper closure. Replace if necessary.
	Pressure tubing disconnected, ruptured, or plugged	Check tubing for kinks, breaks, contamination, or loose connections.
Pulse-cleaning never stops	Pressure switch terminals on the timer board jumpered	Remove jumper wire on solid-state timer board before wiring to the Delta P control.
	Pressure switch not wired to the timer board correctly	Connect the pressure switch on the timer board to Terminals 7 and 8 on TB3.
	High or low setpoint not adjusted for system conditions	Adjust setpoints to current conditions.
	Pressure tubing disconnected, ruptured, or plugged	Check tubing for kinks, breaks, contamination, or loose connections.
Alarm light is ON	Alarm setpoint too low	Adjust to a higher value.
	Excess pressure drop	Check cleaning system and compressed-air supply. Replace filter cartridges if filters do not clean down.
	Pressure tubing disconnected, ruptured, or plugged	Check tubing for breaks, contamination, or loose connections.
Delta P arrow keys do not work	Improper operation	Press and hold one of the three setpoint keys to use arrow keys.
	Programming keys disabled	Remove the Program Disable jumper from Terminals 3 and 4 on TB2.

Problem	Probable Cause	Remedy
Cleaning light is ON, but cleaning system not functioning	Improper wiring	Check wiring between the Delta P Control and the timer board, and between the timer board and solenoid valve coils.
	Defective solenoids	Check all solenoid coils for proper operation.
	Timer board not powered	Check power ON light on timer board's LED display. If not illuminated, check the supply voltage to the timer board. Check the fuse on the timer board. Replace if necessary.
	Timer board defective	If LED is illuminated, observe the output display. Install a temporary jumper across the pressure switch terminals. Output levels should flash in sequence. Check output using a multimeter set to 150-Volt AC range. Measure from SOL COM to a solenoid output. The needle will deflect when LED flashes for that output if voltage is present. If LED's do not flash, or if no voltage is present at output terminals during flash, replace the board.

Service Notes

Date	Service Performed	Notes

The Donaldson Torit Warranty

Donaldson warrants to the original purchaser that the major structural components of the goods will be free from defects in materials and workmanship for ten (10) years from the date of shipment, if properly installed, maintained and operated under normal conditions. Donaldson warrants all other Donaldson built components and accessories including Donaldson Airlocks, TBI Fans, TRB Fans, Fume Collector products and Donaldson built Afterfilter housings for twelve (12) months from date of shipment. Donaldson warrants Donaldson built filter elements to be free from defects in materials and workmanship for eighteen (18) months from date of shipment. Donaldson does not warrant against damages due to corrosion, abrasion, normal wear and tear, product modification, or product misapplication. Donaldson also makes no warranty whatsoever as to any goods manufactured or supplied by others including electric motors, fans and control components. After Donaldson has been given adequate opportunity to remedy any defects in material or workmanship, Donaldson retains the sole option to accept return of the goods, with freight paid by the purchaser, and to refund the purchase price for the goods after confirming the goods are returned undamaged and in usable condition. Such a refund will be in the full extent of Donaldson's liability. Donaldson shall not be liable for any other costs, expenses or damages whether direct, indirect, special, incidental, consequential or otherwise. The terms of this warranty may be modified only by a special warranty document signed by a Director, General Manager or Vice President of Donaldson. Failure to use genuine Donaldson replacement parts may void this warranty. **THERE EXIST NO OTHER REPRESENTATIONS, WARRANTIES OR GUARANTEES EXCEPT AS STATED IN THIS PARAGRAPH AND ALL OTHER WARRANTIES INCLUDING MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, WHETHER EXPRESS OR IMPLIED ARE HEREBY EXPRESSLY EXCLUDED AND DISCLAIMED.**

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For faster service, have unit's model and serial number,
part number, description, and quantity available.

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Donaldson Company, Inc. is the leading designer and manufacturer of dust, mist, and fume collection equipment used to control industrial-air pollutants. Our equipment is designed to help reduce occupational hazards, lengthen machine life, reduce in-plant maintenance requirements, and improve product quality.

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IOM 9603801, Revision 8
Printed in USA
August 2007